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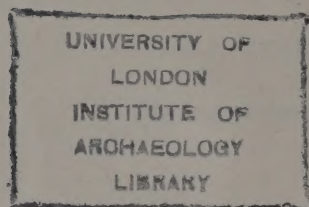
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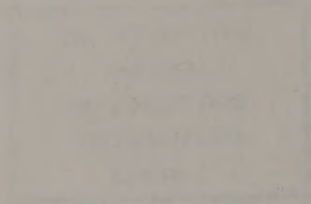
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Professor V. Gordon Childe at the International Congress of Prehistoric and Protohistoric Sciences,
Zurich, 1950

Prehistory since Childe*

by GRAHAME CLARK

The man and his career

In initiating what will hopefully prove to be a fruitful series dedicated to the memory of Professor V. Gordon Childe, the first full-time Director of this Institute, it seems appropriate to begin by saying something about the man and his career. Let me admit that the first part of this undertaking is difficult. Childe was personally reticent and had few close friends. To a quite unusual degree the man was his work. If he had been a more rounded person he might have been with us still. On the other hand he might not have achieved what he did if he had conformed more exactly to the psychiatrists' stereotype. Even his 'Valediction', received at this Institute by surface mail a few days after his death in the Blue Mountains of New South Wales on 19 October 1957, maintained that reticence about himself which makes his prefaces so unrewarding to anyone concerned with the man.

The bare facts of his life can be simply told. He was born in 1892, the son of the Rector of St Thomas's Church in North Sydney. He never married. He attended the Church of England Grammar School at Sydney and Sydney University. In 1914 he took up a graduate scholarship in Classics at Queen's College, Oxford. The only record of formal instruction in archaeology I have (and I owe this information to Mr John Boardman, F.B.A.) is that he embarked on the course for the Diploma in Classical Archaeology under J. D. (later Sir John) Beazley and Marcus Todd. Unlike his fellow candidate Joan (later Dame) Evans he did not complete the course. Instead he took a B.Litt. for a study on an Indo-European topic.

He returned to Australia in the middle of the First World War to join the Australian Union of Democratic Control and campaign against conscription. By 1919 he was private secretary to the leader of this movement, John Storey. His efficiency and zeal is indicated by the fact that he retained this position when Storey became state premier in 1920. Looking back at the end of his life Childe referred to this period as 'a sentimental excursion into Australian politics'. Yet if Storey had not died suddenly in 1921, this lecture might not have been written. Childe found himself out of a job and his attempt to obtain a university post failed owing no doubt to his political activities.¹ His immediate needs were met by the then Labour Premier of Queensland who found him a clerical job in the State Public Service. According to Smith, Childe 'endured this position for about six months and then sailed for Europe'. Perhaps he stuck it out to save his fare.

* The first Gordon Childe Memorial Lecture given at the Institute on 29 April 1975.

What is sure is that Childe was by now thoroughly disillusioned with his native land. This was not only on account of his own personal ill-treatment. Still more influential was his disgust with the avarice and apathy of the Australian workers and the corruption of the Australian Labour leaders. If anyone has any doubts about this let him read the embittered pages of *How Labour Governs*. Did he sail for England by repulsion to get away from a scene of failure and disillusion? Or did the archaeology of the Aryan speakers exert a positive pull? Or did he turn to European prehistory to resolve doctrinal Marxist issues?

A point to remember is that by 1922 Childe was already 30, an age at which most men are already well forward in their careers. Moreover the career of prehistorian did not yet exist. All was uncertainty, the potentially creative uncertainty deplored by planners. One of the few things we know about this period (1922–5) is that in March 1924 he was confident enough to lecture to the Society of Antiquaries on the context of British beakers in European chronology. In 1925 he published his first archaeological book, *The Dawn of European Civilization*, which Crawford (1926: 89) hailed as ‘the most important of its kind that has hitherto been published’, and landed his first job in England, the librarianship of the Royal Anthropological Institute. From this vantage he proceeded to write in rapid succession *The Aryans*, *The Most Ancient East* and *The Danube in Prehistory*.² In those days it was perhaps not so surprising that he should have been invited to fill as foundation professor the new Abercromby Chair of Prehistoric Archaeology at Edinburgh.

The main facts about Childe’s professorial career may be found in Professor Piggott’s Academy obituary (Piggott, 1958: 305 — which is the key source for Childe’s career in Britain). Although he was conscientious in offering courses for the ordinary degree Childe had only one honours candidate in archaeology during his 20 years at Edinburgh. According to Piggott he had no ‘natural aptitude or liking for teaching’. In one’s own experience he was a poor lecturer, though no worse than some scholars of at least equal eminence. Excavation was also a chore and here again Piggott was frank: ‘he was a poor excavator’. During his decade as Professor in this Institute his pupils remained small in number — the primary degree course is after all only a recent innovation — but in some at least he inspired devotion. Whatever his deficiencies as a lecturer — and they were as nothing one gathers to his defects as an administrator — he was transparently honest, cared for his subject and treated his pupils with respect. Throughout his professional career he gave his time mainly to research and writing. He brought out new editions of his scholarly works — those of *The Dawn* were numerous — wrote textbooks for students (Childe, 1930, 1935, 1940, 1946a, 1950) and the series of paperbacks for the public which brought him world fame.

Let me return to Childe briefly as a person. In his obituary Piggott sought to account for his reticence in the lapidary phrase ‘He was very ugly and he was an Australian’. But did Childe realise he was very ugly? If he did he had come to terms with it by the time I knew him. He was at least as willing as the next man to be photographed, he was able to make himself agreeable to the ladies at a social level and his habit of

stroking his moustaches while lecturing always seemed to me to suggest some measure of self-satisfaction. Yet at a deeper level it may well be true that it affected his sub-conscious attitudes, fanning the fierceness of his revolt against his upbringing and leading him to protect himself by reticence. Jack Lindsay gives more than a hint of this in his description of Childe during the Brisbane days of 1921 (1958: 136). 'His odd though likeable face, I felt certain, contributed to his refusal to come too far out of his inner refuge'. His Australianness was also important, not perhaps in making him retiring or causing him to become absorbed in his work — neither characteristic after all of the Australian character — but in a more positive sense. It meant that he came to the subject of prehistoric Europe freshly and even sentimentally with a determination to seek out its essence. When all is said, the fact is that Childe returned to England a wounded, disillusioned man. To quote Lindsay again (1958: 135), at this time Childe's 'strong socialist convictions were being outraged by the insights he was gaining into the realities behind the facade in the political world'.

This is not the place to discuss Childe's attitude to Marxism in any detail. The topic has recently been dealt with by Peter Gathercole (1971: 225) and my topic is not Childe so much as Prehistory since Childe. A few words must however be said.

From an external behaviourist point of view I think his friends would agree he was the most bourgeois person in the world. When he ostentatiously came into a summer conference of the Prehistoric Society with *The Daily Worker* under his arm, you can be sure he had spent the night in the best hotel. His favourite haunt in London was The Athenaeum, where the waiters handed him his 'usual' (about the nature of which there are varying accounts) without the formality of being asked. His entry in *Who's Who* admitted to nothing more revolutionary than bridge, walking and motoring. He complained from Australia on his final trip at the absence of his Athenaeum comforts and my impression is that he included in these the deference he considered his due.

Intellectually and emotionally on the other hand there is no doubt in my mind that, having once propelled him into archaeology on the rebound so to say, Marxism exerted a seriously inhibiting effect on his middle years. It helps to explain why after 1930 or so Childe's creative period was essentially over and why at the end of his life he realised that his prophet had played him false. Whereas in 1946 he could still argue (1946b: 251) that there was a 'prospect of reaching general laws indicative of the direction of historic progress', in his 'Valediction' he had to admit that while Marxism had once seemed to make intelligible the development of each culture it 'completely failed to explain the differences between one culture and another and indeed obliterated or dismissed the differences observed' (1958: 6).

I have said something — very little in effect — about Childe as a person. What about the first and second words of my title? Childe was a prehistorian and I have chosen to speak about prehistory, not about archaeology as such. Yet no one realised more keenly than Childe himself that archaeology was his main tool in trying to reconstruct what happened in prehistory and in particular how European civilisation achieved its unique character. His attitude was stated very explicitly on the opening page of *Scotland before*

the Scots in which he declared his aim to 'extort from the archaeological data a story of development, of a process in time...'. Note the word 'extort'. One can hardly dissociate the writing of prehistory — for prehistory is paradoxically something which only exists when it is written down — from the process of extortion from archaeological data. What we know — what we can know about prehistory — is conditioned by the methods we use to extract information from the debris just as these in turn are conditioned by what we seek to learn about prehistory. There is a feed-back between the aims of the prehistorian and the procedures of the prehistoric archaeologist just as vital as there is between the various aspects of the life of the communities which existed in prehistoric times.

It is important I think to realise that, like some of the seniors still with us, Childe was virtually self-taught as an archaeologist. He came to Oxford as a classicist and received very little formal training in archaeology. What he did get was an insight into the formal analysis of pottery from Beazley, something which stood him in good stead for the rest of his life and, even more important perhaps, an impression from the example of Arthur Evans of what could be done in the way of distilling history from artifacts. It can hardly be a coincidence that he should have begun his first lecture to the Society of Antiquaries (1925b: 159) as follows:

'The publication of the first volume of Sir Arthur Evans' *Palace of Minos* (1921) marks the beginning of a new era in the prehistory, not only of the Aegean, but of Europe as a whole.'

He ended his lecture with a table synchronising the prehistoric successions in Britain, the Nordic province, Silesia and the South Danube between c. 2500–1500 BC with Evans' periods EMII–LM Ia. During the discussion Mr Reginald Smith is recorded as having confessed to feeling much refreshed by the infusion of so much material from the continent in the discussion of a problem in British prehistory. This was high praise from Mr Smith.

By whatever means, Childe became convinced that it was possible to extract from raw archaeological data the kind of information needed to understand the genesis of 'European civilization as a peculiar and individual manifestation of the human spirit' which he proclaimed as his aim in the opening paragraph of *The Dawn*. Since he had not been trained as a prehistoric archaeologist he had in that supremely creative period in the wilderness between 1922 and 1925 to think out for himself how he was going to achieve this. The drawback was that having once made this effort Childe made no further contribution of importance to the discipline of prehistoric archaeology as such. He had achieved what he was going to achieve in this genre essentially by 1930. In so far as I speak of Prehistoric Archaeology since Childe I will in effect be speaking of what happened since then. As a prehistorian on the other hand Childe is in a real sense still with us. We are working in a world which was to a significant extent of his making.

The classification of archaeological data: periods and cultures

Before turning to this larger prospect I must dwell for a moment on his own contribution as a prehistoric archaeologist. It is originality that gives impact to a book. For

most of you it must take some effort of the historical imagination to appreciate the impact of the original *Dawn*. I am in an easier position because I was still an undergraduate when the 2nd edition — in effect a reprint with a single page addendum — appeared in 1928. In thinking about this lecture I turned up my copy with its undergraduate scorings. To myself and the very small handful of contemporaries reading archaeology as an undergraduate course *The Dawn* had something of the character of a sacred text. How did it appear to my seniors? We know Crawford's reaction. He had all the flair of the born journalist for new ideas. He realised at once that Childe had produced a truly original book. It was original not merely for presenting to insular readers an enlarged perspective to European prehistory, something I shall return to, but also in the way Childe used the raw data. He supplemented an exclusively chronological by a cultural approach. By this I do not mean that he rejected the need for periodisation. Far from it. Periodisation formed the basic framework of *The Danube in Prehistory*. No one realised more clearly that in dealing with traces of prehistoric societies, which by definition left no written records, it was all the more necessary to find objective means of plotting the flow of time. But for Childe the temporal sequence was only the beginning, not the end of archaeology. The end was to define and understand the prehistoric communities to which the archaeology related.

Childe appeared at the right moment. In the more advanced archaeological countries of Europe the gross outlines of periodisation were already defined by the end of the 19th century and by the First World War much of the detail had been filled in. During the 1920s most of the professionals, at that time still largely museum-based, were still trapped, but it must have been evident to someone coming fresh to the scene as Childe did from Australia that the returns to be gained from chronological system-building were rapidly diminishing over much of Europe. It must have been equally apparent that without some understanding of the nature and spatial reference of the data there was little to be learned even from its detailed periodisation. Above all Childe realised that the kind of abstract treatment accorded to geological formations was totally inadequate for dealing with traces of human societies. What was needed was a method of distinguishing between the different societies represented by archaeological data. How Childe set about this is formulated most explicitly in the Preface to *The Danube in Prehistory* (v/vi). What 'certain types of remains — pots, implements, ornaments, burial rites, house forms constantly recur(ring) together', he wrote, we term 'such a complex of regularly associated traits ... a "cultural group" or just a "culture"'. Such 'cultures' were conceived of as occupying space as well as time. This was formalised in *The Dawn* by the provision of maps showing the extent of different cultures at four periods of time spanning the Neolithic and the earlier half of the Bronze Age, as well as by chronological tables relating to a number of defined geographical zones and recording the extent in time of cultures. Childe conceived archaeological data as existing in two dimensions, in space as well as time. This was his essential contribution to prehistoric archaeology.

When Childe came to archaeology it is not surprising in view of the state of the subject that he should have regarded a more adequate system of classification as a first

priority. Such training as he had in Classical Archaeology gave him a keen appreciation of form analysis. Throughout his life he had an amazing visual memory understandable in a pupil of Beazley but all the more remarkable that he found it difficult to represent objects graphically. His concept of the archaeological culture was a decisive contribution which served his purpose, but it was one which trapped him in the sense that he never took the next step. We must remember that he was already 33 when *The Dawn* appeared. Thereafter his new thinking was devoted to prehistory rather than to prehistoric archaeology as such. Over 20 years on, in what must have been one of his first publications, if not the first, since his appointment to the Directorship of the Institute, we find him still hammering away at the notion that both are 'classificatory sciences' (1946b: 243). It is revealing also that he should have been so preoccupied with the ancient issue of diffusion v. evolution that he was inclined to dismiss the functionalism expounded by Malinowski and Radcliffe Brown as 'not a little affected by the reaction against this windy controversy'. There is no sign that Childe was to the slightest degree influenced in his approach to archaeological material by the seminal writings of these men whose *Argonauts of the Pacific* and *Andaman Islanders* appeared in 1922, the year he returned to England. When years later he showed signs of being aware of what they were getting at, it was rather as a bystander. In his 'Valediction' he admitted (p. 2) that

'A deeper analysis and ecological description of recognised cultures directed towards disclosing the functional integration of their surviving constituents and reconstructing the economic and sociological linkages between the latter are suitable themes for doctoral theses ...'

This was hardly the language of immediacy or personal involvement and the passage came from a paper written 36 years after the publication of the decisive books. The ecological approach to archaeological data ventilated nearly 20 years before the Valediction was nevertheless 'since Childe'. Before I turn to this it will be convenient to say a little more about Childe and anthropology. Although he failed to profit from the most significant development of his day in this field, he was paradoxically strongly influenced by the writings of such ancients as Tylor and Morgan. On the other hand he was sufficiently aware of the fallacy inherent in Fraser's method to avoid the error into which it has become fashionable to fall to-day, more especially one might add in the media and what might charitably be termed post-T.V. books. No one realised more keenly the folly of picking and choosing scraps of evidence from different cultures and applying them out of context. By doing so the same archaeological phenomena could of course be 'explained' in a multitude of different ways. To quote again from his 'Valediction', Childe wrote:

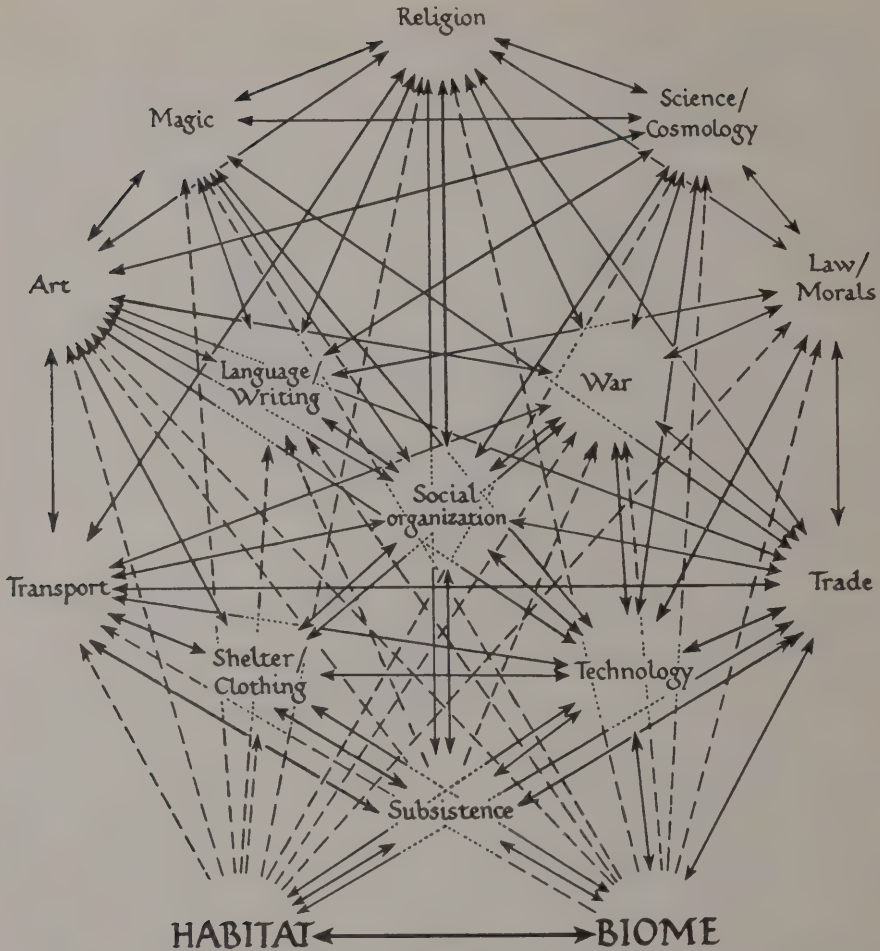
... 'it is fun to find the same pattern on an Arunta churinga and an Irish grave slab. Let us not waste our time in deciphering such sepulchral carvings by reference to the recorded meaning of similar patterns in aboriginal Australia. The value of such ethnographic comparisons is just to show the funny kinds of meanings and purposes that may be attached to the queerer kind of archaeological data.'

The ecological approach: synchronic

Since Childe developed the notion of the archaeological culture, the logical next step was to seek to reconstitute the lives of the communities implied by these assemblages. It was necessary to introduce a third dimension — to add life to time and space. Before discussing the ecological approach — has one got to say model? — I think it important not to overlook the fact that new ways of looking at archaeological data seldom invalidate older ones, though they sometimes help them to be followed in a more sophisticated manner. Just as Childe realised that there was a continuing need to devise and refine archaeological chronology, more especially in new or less well explored territories, so we may recognise the continuing need to distinguish the communities which existed in prehistoric times. Indeed the application of more refined quantitative methods should make it possible to establish these with greater certainty and precision than the impressionistic methods used in the past. Yet just as chronological systems can be devised more intelligently when account is taken of the spatial extent of particular artefact assemblages, so the validity of archaeological cultures can often be tested when the data is viewed in ecological terms. The very notion of a third dimension implies after all the existence and equal importance of the other two.

Historically the source of three-dimensional archaeology was derived in part from the kind of functional anthropology initiated by Malinowski and Radcliffe-Brown and in part from the development of animal and plant ecology. Both these were mainly British. Anyone reading both Archaeology and Anthropology at Cambridge before the war was indeed privileged. I can still hear Col. Hudson telling us that the essence of Anthropology was food and sex, keeping alive and perpetuating, not forgetting the social arrangements evolved by different communities to ensure these things. Radcliffe-Brown was compulsory as well as compulsive reading. And, as I've told elsewhere, the 1930s were the years in which pollen-analysis, a principal tool of environmental archaeology, was not merely being developed in the Botany Department but being applied to the prehistory of human settlement in the Cambridgeshire Fens (Clark, J. G. D., 1974: 35; see also Phillips, 1951: 258). Living systems and the interactions between their components were so to speak in the air. One grew up with a view of archaeology which some seem only to have re-discovered lately and by way of transatlantic proponents of the so-called New Archaeology.

The concept of human societies operating as systems, in which every component contributed to the functioning of the whole, was set out as a basis for the interpretation of the archaeological traces of former states of society in a widely used and several times translated text written just before the war and published in 1940 (Clark, J. G. D., 1940: 152) as well as in a slightly more elaborate form, in the Reckitt Archaeological Lecture for 1952 (1952: 215; 1957: 175). I would ask you to observe two things about these diagrams. First, the arrows linking different dimensions are double ended. This was intended to denote that inter-relationships were dynamic and reciprocal. In more modern jargon they demonstrate the importance of feed-back within the system. Diagrams of this sort are necessarily flat. A better impression might have been given by building the kind



Simplified diagram illustrating some of the synchronic interrelations of aspects of human ecosystems.

Reproduced by permission of the British Academy from the Reckitt Archaeological Lecture for 1953

of model with coloured symbols threaded onto wire used by molecular biologists to demonstrate the complexity of the genetic code. The other thing I would like you to note is that in the 1952 diagram human social systems are specifically integrated with the biological and physical aspects of total eco-systems. This stemmed in part from involvement in Quaternary Research, first in the work of the Fenland Research Committee (1932–40) and later in connection with Star Carr (1949–52) (Clark, J. G. D., 1972a). No less influential was the overtly ecological interpretation of two of the most original

successors of Malinowski and Radcliffe-Brown, namely Donald Thomson whose study of the seasonal aspects of Wik Monkan culture was published in 1939 and E. Evans-Pritchard whose *Nuer* appeared in the following year. It is important to note here that the ecological approach was not only free from, but was a denial of the dreary determinism of some of the earlier geographical approaches to archaeology. The relationships between the several dimensions of human life and different facets of the natural environment were seen not as one-way but as two-way. Each of the manifold relationships was held to be reciprocal. If the environment set constraints on economy, forms of economic life affected the environment. Similarly if economic factors influenced social organisation and ideology and value-systems, the converse is equally true. No wonder that Childe in the end had to abandon Marxism as an adequate tool for explaining prehistory.

You will have noticed that studying archaeological data in terms of ecosystems by no means implies any neglect of geographical references: on the contrary ecosystems are based on and indeed incorporate territories. It is merely that archaeological cultures in the sense distinguished by Childe are considered as relics of once living systems instead of merely or mainly as aggregations of traits useful for the purpose of territorial classification. The same methodological problem arises, that of definition. Individual ecosystems, like archaeological cultures, only exist as isolates for convenience of study. Although in general I intend to leave questions of methodology on one side, I must say just a word about the problem how we are to define phenomena which are only isolates for the purposes of study. It is perhaps significant that Malinowski and Radcliffe-Brown both chose small islands for their pioneer studies. In this way the unit of study was neatly and impartially defined by geography. Even so one cannot forebear to mention that not even islands in the midst of the Bay of Bengal or the Pacific Ocean can always remain in isolation. Had this been the case they could hardly have been populated by man. On the other hand archaeologists and anthropologists as well are for most of the time confronted by more extensive territories, whether continents or large islands, likely to have been shared by communities united by different values, having distinct social systems, equipped by distinctive technologies and utilising their environments in different ways or at different levels of intensity. In short the problem remains of defining the areas occupied by communities united by distinctive cultural traditions or by different ecosystems or social territories, however one prefers to term them. Childe himself was well aware of the value of distribution maps in this regard. Those in *The Dawn* were abstract in the sense that they embodied his own considered views without indicating their material basis. In *The Danube in Prehistory* he had more scope to be concrete. It is evident that he relied primarily on pottery. He did so for the familiar reasons. In early times it was primarily a local product, it was made in abundance, it survived relatively well and although representing only a single craft, which may in some cases have played a relatively unimportant role, the product was complex and involved a number of variables, including composition, building, firing and shape as well as the technique, form and disposition of ornamentation. But Childe was also prepared to take account of any cultural preference consistently reflected in the archaeological data. The difficulty was

that his criteria were eclectic, even impressionistic. He would throw in barrow forms, metal types, ornamental motifs, religious practices, anything in fact that helped to fill out distributional patterns and define territories. Some of his contemporaries were less catholic. Indeed, in extreme instances they went to the length of defining cultural territories and even of inferring series of invasions on the basis of variations in single traits, as with Harold Peake's bronze sword hilts and on this precarious basis seeking to explain the course of prehistory. It is interesting that, although Childe entitled his Oslo lectures of 1949 *Prehistoric Migrations in Europe*, we find him in the first one quoting with approval the long held Russian view that one should always seek explanations in terms of local developmental processes before having recourse to external causes and stating in so many words that he himself proposed to 'make a minimal use of migrationist hypotheses'. To-day the task of defining socio-cultural territories is recognised as a problem calling for a more methodical approach. Specifically it is one of the many problems in archaeological method from which we may expect increasingly valuable results from the application of mathematical procedures. As was so well illustrated at the recent Anglo-Romanian Conference dedicated to this theme, mathematics can provide tools, which so long as they remain tools, are capable of extorting history from an increasingly broad range of material phenomena (Hodson *et al*, eds., 1971; Doran and Hodson, 1975).

Let me now consider some of the implications of adding a third dimension to archaeology. First, I think, it transforms our attitude to the raw data. One has only to glance through the pages of *The Dawn* to see how vestigial is the evidence used to define the dimensions of time and space, by comparison with that needed to reconstruct living systems. At the primary, elementary level of excavation, the enlarged objective requires a changed order of priority in the selection of sites and in the methods used to recover data. That is why, in a simple text entitled advisedly *Archaeology and Society* written in the middle of Childe's tenure of the Abercromby chair, I laid so much stress (chapter III) on the factors controlling the survival of different kinds of archaeological data. Star Carr was not dug to find yet more microliths nor would I have supported the researches in the Somerset Levels being carried on by Dr John Coles and his team so consistently out of an anxiety for the recovery of yet more polished axes or Neolithic pots. Projects of this kind have been selected explicitly in order to widen the range of data. Let me make the point appropriately by reference to arrowheads. When I was a boy they were one of my chief prizes as a flint collector. In the pre-Childe literature leaf arrows, like long heads and long barrows were classified as Neolithic and barbed-and-tanged arrowheads along with short heads and round barrows as Bronze Age. Childe assigned leaf-shaped arrowheads to the Windmill Hill and barbed-and-tanged to the Beaker culture. Both were very approximately correct. But it is also right to see these pieces of flint as the armatures of arrows that were propelled by pulling bows. It was indeed the recovery by peat diggers of the Neolithic bows from Ashcott and Meare (Clark, 1963: 50) that still further enhanced interest in the Somerset levels already famous for the state of preservation of the Glastonbury and Meare Lake Villages, for the Quaternary Research work of Sir Harry

Godwin (1960: 1) and his associates and not least for their timber trackways (Coles *et al*, 1968, 1970, 1973a, 1975). Study of bows, like any other category of archaeological find in functional terms opens up manifold fields of research. Details from a broad range of archaeological sources previously studied in isolation take on new meanings when focused on activities rather than on categories of objects. Conversely the desire to investigate activities defines areas of ignorance, the essential prerequisite for creative research as distinct from the mere salvage of material objects or structures. In particular it points to the need to obtain adequate samples of materials hitherto neglected because irrelevant to the needs of conventional temporal or cultural classification. Here again we have a feedback from research needs to techniques. The development of the froth flotation apparatus by the British Academy Early History of Agriculture Project at Cambridge (Jarman *et al*, 1972: 39) is only one of a multitude of instances.

The three-dimensional approach has another advantage. Since reciprocal relations exist between different spheres both of the natural environment and also of social life, it follows that each can be manipulated to probe others not always at first sight connected. In the case of arrows the relevance to subsistence and so to settlement is of course evident. It can among other things serve as a useful check on the nature of man—animal relations at particular sites. If all was love and understanding between men and reindeer at Stellmoor (Rust, 1943: 85) or between men and red deer at Star Carr³ one might well ask why arrows were so prominent at both and why the skeletal remains of both species should show evident signs of their use. Again, where archery is established in the archaeological record it can sometimes be used to account for enigmatic representations in art. Thus the clear representation of a bow and its attendant quiver helps to confirm that the engraving on the inner face of one of the slabs in the burial chamber of Göhlitsch in fact depicts the inner wall of a gabled timber house (Clark, 1963: Pl. IX lower). Conversely and more frequently the iconography of rock-art for example may complete information about archer's equipment and still more usefully tell us about the bow's tactical use in hunting: rock-paintings in Eastern Spain for instance show ibex encircled by and red deer driven into bowmen. The various elements in the make-up of ecosystems embracing human societies compare with the strands in a prehistoric textile: Professor Vogt (1937) found that the best way to unravel the sometimes complex weave of Cortaillod samples was gently to tug individual strands and see how they related to others.

The fact that much can be learned by studying different aspects of social life, as represented by archaeological fossils, in conjunction is hardly contradicted by the fact that at an advanced level the pursuit of three-dimensional archaeology has increasingly to be carried on by specialists. Here I am not thinking so much of regional or temporal specialisation as of preoccupation with different aspects of the subject, whether environmental, economic, demographic, technological, social, political, conceptual or aesthetic, or again as Dr David Clarke (1968) has so amply demonstrated with the different techniques brought to bear on the analysis of archaeological data. Indeed the more we think in terms of three-dimensional archaeology the more necessary it becomes to draw on the maximum range of expert knowledge in respect both of the activities, organisation and

conceptual life of communities of men and of the techniques and procedures available for analysing the material detritus of these. Anglers, toxologists, musicians, wood-turners, boat-builders, sailors — these and many more such — have special kinds of knowledge only available by accident to the professional archaeologist. This is an area, I believe, where the amateur can do most for archaeology, not by doing in his spare time what the professional is better equipped to effect, but contributing his special knowledge of how things work to the interpretation of archaeological data. I repeat what I have often said before that there is no kind of knowledge, no kind of experience, which cannot be of value to the elucidation of the past once this and not the manipulation of the data is regarded as the main object of the prehistorian or for that matter the historian. Professor Evans (1975: 8) expressed it perfectly in his recent inaugural lecture as Director when he remarked that 'one of the beauties of archaeology is that almost any talent may turn out to be relevant'.

The most impressive outcome of the new approach is surely the emergence and growth to maturity of science-based archaeology.⁴ Here one can see very clearly the extent of the feed-back between aims and methods. To take only one instance, so long as the chief and indeed in some cases only aim was classification, then adequate dating and the analysis of form and style of artefacts were sufficient. In so far as the role of artefacts in social life comes into question as a principal aim on the other hand it becomes important to define the precise source of materials, the processes by which they were manufactured into useful objects and the exact manner in which they were used. This leads directly to the appropriate branches of natural science and technology. Conversely it is known to have provided important stimuli to research in these fields. Again, as new apparatus or procedures, developed it may be in industry or in medical or military science, become available, historians and prehistorians may be encouraged to ask new and more searching questions. Such a process of continuous feed-back between the arts and sciences is one reason why archaeology has such a high potential as a subject of general education. The converse is no less true that the best prehistorians are likely to be those most aware of the possibilities in both camps. In the study of prehistory there is a constant interaction between aims and methods. Investigation of social structure for example has been immensely facilitated by computer technology and conversely the availability of this technology has led prehistorians to tackle problems previously considered beyond their reach (Leone, 1972, gives an instructive review of the field). The systematic coding and programming of graves, skeletons and grave-goods, to quote only one example, offers new insights into demography and social organisation. Similar insights can be won from the disposition of finds on settlements and within dwellings. In each case the basic requirement is pre-excavation survey and total excavation, each of which has been facilitated by a variety of chemical geophysical techniques, air-photography and mechanised precision excavators. The needs and requirements of three-dimensional archaeology are indeed formidable, but the returns in new knowledge are immeasurably greater than the mere salvage of repetitious data that too often passes for archaeology.

An aspect of antiquity traditionally emphasised by archaeologists, even if some of them have long ceased to merit the jibe that they were more interested in *Homo faber* than in *Homo sapiens*, is of course technology, though even here, as I've already pointed out, there has been a welcome extension of range from that needed for mere classification. During the generation just past on the other hand two additional fields have claimed attention, notably Environmental Archaeology in which this Institute has long played a leading role and Economic Prehistory. A particular aspect of this latter The Early History of Agriculture was adopted by the British Academy in 1966 as its first Major Research Project. Among the many publications issuing from this may be cited the three volumes edited by Mr E. S. Higgs (1972, 1975 and forthcoming), director of the Project during its decade of operation. Latterly we have seen new and welcome developments in other fields. The claims of Social Archaeology, grotesquely overlooked in the past, have received a welcome advertisement in Professor Colin Renfrew's recent Inaugural Lecture at Southampton University (Renfrew, 1973).⁵ The archaeology of man's conceptual life has also recently been claiming increasing notice: I need only mention Alexander Marshack's (1972) illuminating study of notational markings on Palaeolithic art objects or the many fields of research considered in the course of the symposium held by the Royal Society and the British Academy on early astronomy (Kendall *et al*, 1974, particularly A. Thom's paper on the astronomical significance of prehistoric monuments in Western Europe).

At an operational level mention should be made of Experimental Archaeology recently surveyed by Dr John Coles (1973b: a much fuller bibliography of various aspects of the field is given in Herter and Heizer, 1973). Plainly the more emphasis is laid on the archaeology of once living systems, the greater the importance of devising experimental tests. For instance I've spoken of prehistoric bows. By constructing accurate models in the same kinds of wood and testing them in practice something measurable can be learned of their range and accuracy. Again it is valuable to test the functional labels of such flint forms as burins by using replicas and then comparing traces of wear on these with that observable on prehistoric specimens. Dr Coles' experiments on shields and musical instruments are other cases in point. And we should not forget the experiments in early farming methods carried out by the National Museum of Denmark, experiments ranging from clearance of forest by axe and fire to the sowing, reaping and grinding of cereals.

The ecological approach: diachronic

The data we study relate not merely to abstract time, to space and to real societies that existed in time and space, but to societies that changed their configurations in the course of time. Ecosystems have historical as well as existential dimensions. We can only hope to understand the course of change if we first understand function. The antithesis between Social Anthropology as a subject concerned with the synchronic study of society and Archaeology as one dealing with diachronic phenomena is no longer drawn so sharply as it once was. Social Anthropologists now feel sufficiently sure of themselves to admit

that history is an undeniable dimension of any human society and archaeologists, as I have tried to indicate, are showing more interest in the way societies operate. Yet it is still true that Social Anthropology's main contribution to intellectual life rests on its ability to gain insights into the way societies operate in the short term, whereas the unique property of Prehistoric Archaeology is the ability to discern and explain changes in human affairs over the enormously long periods of time at its disposal. By facilitating the task of reconstructing the socio-cultural systems functioning in particular spatial and temporal contexts, the ecological approach has made it possible to attempt the even more formidable task of seeking to unfold the process of change through time, which in effect constitutes prehistory. In more concrete archaeological terms it is capable both of offering a more adequate interpretation of the data from single periods of occupation than a merely formal analysis of artefacts can do and of accounting for the differences existing between material from successive occupations.

When prehistoric archaeologists confront material from long sequences they consistently find evidence for what appear to have been relatively long periods of stability separated by phases of rather drastic change.⁶ Yet quantitative analysis shows that behind a succession of distinct cultural configurations there is often evidence for continuous but gradual change in respect of individual components. To be acceptable a theory of cultural change needs to take account of both phenomena. This is what the ecological approach allows. We can accept as a working premise that the total environments in which any ecosystems operate are subject to change. For systems to operate effectively – and if they are not effective they will not long survive by any archaeological reckoning – it is necessary for at least some components to undergo a process of adaptation. Yet systems only survive in so far as they retain their coherence and integrity. Up to a point this can be achieved by adjusting to such adaptations on the part of certain components. Beyond this on the other hand the cost of maintaining the *status quo* may become so excessive that it is less demanding and therefore adaptively advantageous to effect a radical change and achieve a new configuration, a new kind of pattern to which members of society conform and which appears in the stratigraphic record as a new culture or at least as a new phase of cultural development. This would be no less true because certain components persist, though often modified in form or relative importance, through successive configurations.

It happens that in my own areas of specialisation I have focused more particularly on changes in habitat and biome, notably the contraction of ice-sheets, changes in land and sea levels and their effect on topography and the availability of resources, climate, vegetation and animal life. Childe significantly referred these to what he termed the 'external' environment. From an ecological standpoint on the other hand habitat and biome are themselves integral parts of systems comprehending human societies. Moreover there is commonly a significant feed-back relationship, so much so that one often expects to gain information about basic economic activities like farming through the study of vegetational change. On the other hand there can be no question of changes in habitat or biome determining the course of prehistory. They were merely some among a number

of changes to which human societies adapted through their cultural apparatus and in some cases let us not forget they were themselves the outcome of changes in the socio-cultural sphere.

In so far as Childe and his contemporaries sought to explain why one culture gave place to another, they did so in a perfunctory manner. There was a limited number of stock explanations. Cultural changes were accounted for by and large in terms of biological, climatic or geographical changes and/or in terms of the socio-cultural environment, notably 'influences' from other systems or more specifically trade or conquest and ethnic replacement. The author plumped for one or a combination and left it at that. There was little attempt at explanation or testing. More satisfying conclusions can be reached, I suggest, in terms of ecological theory. A point of departure is that eco-systems only exist in isolation for the convenience of analysis. In reality they intermesh with others, even ones remote in space. If this is true for instance of plant communities, which may be influenced by the movement of fruits, pollen or spores from far away, it applies with even more force to systems comprehending human societies. This is so because these are positively constituted by sharing, by the redistribution of goods and skills and above all perhaps of ideas, something made possible by the incomparable range and efficiency of communications within and between human societies.

Now just as the unique configurations embodied in archaeological cultures are the product of interaction between the individual communities occupying social territories (Clark, 1975: 14), so it must be supposed were the larger societies themselves subject to influences not merely between neighbours through conflict or interchange, but also from afar through the movements of individuals and above all of objects and ideas. It is true enough that the very nature of societies, constituted by sharing territories and a whole configuration of ideas, techniques and values, not forgetting a common social structure, made them to a large extent proof against this bombardment so long as they were functioning effectively. The fact remains that ideas are potent and never more so than when systems are under strain. Whether in any situation we can hope to identify the final straw that tipped the balance is perhaps less important than seeking to estimate the pressures which over lengthy periods of time threaten the integrity of any system and can only be accommodated by adopting a new one with a different configuration. One indication of the importance of external influences in promoting cultural change, which I only have time to mention is of course the relationship between centrality and progress and between isolation and stagnation. Another topic about which I must be brief is invasion or wholesale immigration, the most violent and, if substantiated, sweeping kind of external influence. If I have deplored the use of invasion as a *deus ex machina* (Clark, 1966: 172) it is for the good methodological reason that it has tended in the past to inhibit research into alternative causes for the changes in our rough island history. It is often argued that the fact that ethnic movements can be documented from history implies that they operated in prehistory. I would prefer to put it the other way round and suggest that prehistorians, by treating invasions as hypotheses and testing them against the evidence as adequate explanations for cultural change, could well put in

question not merely the implications but sometimes even the validity of such historical sources. In any case arguing backwards in time is an outrage in historiographic terms, since it is of the essence of history to weigh evidence in its contemporary context. What applies in one cannot be assumed to apply to another. Another point to remember is that not even the resources of the most modern military science have succeeded in obliterating peoples. As for cultures conquest has rarely been as effective as an agent of change as peaceful processes operating through time.

Another and in the long term more significant factor making for change was what I have elsewhere referred to (1975:27) as the inherent dynamism of human societies. I refer to the built-in trend towards a more effective and intensive utilisation of natural resources, making possible a greater density and concentration of population, a greater sub-division of functions and in consequence more effective and explicit political institutions. I have used the word built-in advisedly, since as I argued in *Aspects of Prehistory* (1970, chapter 2) the more effective use of resources and all that follows was an adaptive advantage so potent that it was a main factor in social selection. And let us not forget, failed societies leave no archaeology or at least none worth looking at. At this point I ought I suppose to refer to Childe's Neolithic and Urban Revolutions which exist in our thoughts whether or not they did in prehistory. I would only comment that the new methods of approaching prehistory, while they have not destroyed the familiar trilogy of Savagery, Barbarism and Civilisation as a parable, have disposed of its claim to offer what can be accepted as in any sense an explanation of prehistory. What prehistorians now visualise is the operation of inexorable processes, inexorable because, except in the refuge areas beloved of the classic Social Anthropologists, conformity to them was the price of survival. All prehistorians can hope for is to define the thresholds from one form of social life to another. Whether particular thresholds were revolutionary in the sense of being abrupt or whether they were smooth and gradual can only be assessed in terms of local research. There is nothing in ecological theory which rules out the possibility of comparatively rapid changes. On the other hand, as more than one speaker during the recent symposium on the Early History of Agriculture argued, the more closely the process of domestication, the basis of the first of Childe's 'Revolutions', is studied, the more gradual it is seen to be.⁷ Paradoxically, although in the abstract everyone admits the reality of different states of society, these can often only be defined in the archaeological record by statistical means.

The scope of prehistory

In the course of this lecture I have intentionally kept to the higher ground, if not as some of you may think even to the world of clouds and theory. If I had done otherwise I could not possibly have covered more than a fraction of the territory. To conclude, let me touch briefly on the more banal matter of the temporal and spatial scope of prehistory. Although Childe wrote occasionally on the palaeolithic he did so without much conviction. His real concern began with the Mesolithic contrivers of his Neolithic Revolution. Yet, since Childe, concern with the definition and meaning of man has again

focused attention on the earliest periods of prehistory. Of recent years this quest has centred on Africa and more especially in East Africa. It is interesting to observe that even for the remoter periods of prehistory there has been a distinct shift from exclusive concern with stratigraphy and cultural classification to attempts to recover the forms of dwellings and analyse in detail the activity patterns to be inferred from the precise plotting of artefacts and palaeontological material. This in turn has involved, as was outstandingly the case at Kalambo Falls, Zambia (Clark, J. Desmond, 1969), and the much older beds in the Olduvai Gorge, Tanzania (Leakey, 1967:417; cf. Isaac, 1969), the application of stripping and plotting techniques of the kind originally worked out in connection with the settlement archaeology of later prehistoric Europe. If one of the main contributions Prehistory can make is to man's understanding of his place in the world, it is understandable that one of the main areas of research in a temporal sense must lie far back in the Early Pleistocene and perhaps even earlier when he was in the very process of emerging from his hominid antecedents.

In his first Inaugural Lecture Professor Evans claimed as one of Childe's basic tenets 'the necessity of mastering and using in our studies the widest possible range of comparative material' (Evans, 1958:49). It is true enough that Childe himself wrought a revolution in this regard. When he came to England again in 1922 he found British Archaeology divided into two camps working 'very nearly in watertight compartments' (Childe, 1929a:v). British insular archaeologists organised on a quasi feudal basis conducted their local and even national researches with only the barest if any reference to the European continent. On the other side were those concerned with the archaeology of the classical and bible lands whose activities focused on the Mediterranean and the Middle East. In between there was a virtual blank. It was a major contribution of *The Dawn* to set later prehistoric Britain in the context of temperate Europe, temperate Europe in that of central Europe and the Aegean and that of the Aegean in that of *The Most Ancient East*. Yet Childe remained a prisoner of Europe and the territories which influenced it in prehistory. If he looked to China it was not on account of Far Eastern civilisation but to pursue the origins of socketed bronze spearheads. He showed no interest in the New World, Sub-Saharan Africa, the Pacific or even his native Australia.

The half century since Childe came to prehistory has witnessed a world-wide expansion of archaeological research which is now pursued as extensively as botany or geology. What is at least as important is that since 1949 the technique of radiocarbon analysis had made available that form of 'trustworthy chronology, independent of archaeology and of any historical assumption' to which Childe was still looking forward in his 'Valediction'. Without a world-wide system of dating there was no possibility of extorting a world prehistory from the mere multiplication of local archaeological sequences. It is a matter of record that if the basic research leading to the development of radiocarbon analysis was carried out in the Institute of Nuclear Physics at Chicago, much of the impetus and direction came from the human sciences. The preface to the first edition of *Radiocarbon Dating* acknowledged the financial support of the Wenner-Gren Foundation for Anthropological Research during the crucial years 1948-50, as well

as the help in selecting samples offered by the Committee on Carbon 14 of the American Anthropological Association and the Geological Society of America under the chairmanship of Fred Johnson (Libby, 1949; also 1970).⁸ In this field anthropology was the patron, natural science the creative agent. The feedback or pay-off was tremendous. The foundations for a truly world-wide prehistory were being laid during the years preceding Childe's 'Valediction' and the structure, however incomplete in detail, has long since been taken for granted. Within the last 50,000 years or so of its effective range radiocarbon analysis has contributed more than any other single technique to making this possible, complemented for the remoter periods by such other chronometric methods as potassium/argon and uranium fission track.

The enlarged scope of prehistory allows us to view Childe's objective in a new light. European civilisation can now be seen more clearly to have been only one of a number of unique manifestations of the human spirit. Indeed from an ecological point of view, making all allowances for contacts, it would be inconceivable to view any culture otherwise than as constituting an essentially unique system. It is ironical that if Childe had taken a more ecumenical view he might have freed himself much earlier from the antiquated folk-lore of Karl Marx. It is pathetic to find him admitting in his 'Valediction' that

'Universal laws of social development are far fewer and far less reliable than Marxists before 1950 thought.'

It was as a great prehistorian, a man dedicated to his subject, to an unusual degree unconcerned for himself, that we salute the memory of Gordon Childe. His integrity shines through in his published works. In these he drew a clear distinction. He never tried to score debating points off colleagues by appealing to a lay public. In his professional writing he was scrupulous in documenting his facts and in keeping his works up to date. In addressing the general public, which perhaps wisely he did through the printed word, his tone was never condescending or dogmatic. He sought merely to engage interest. If he took the trouble to write a series of books for the general reader from *Man makes Himself* (1936) to the posthumous *The Prehistory of Human Society* (1958), this was because he thought his subject was one of broad human concern.

If like the rest of us Childe was in a measure a prisoner of his own past, I need quote only one sentence from his 'Valediction' to show that by the end of his life he saw well enough the way things were moving in the study of Prehistory.

'The economic, sociological and ultimately historical interpretation of archaeological data has, I believe, now become a main task.'

FOOTNOTES

- (1) According to F. P. Smith in his foreword (pp. v-x) to the 2nd edition of Childe's first book *How Labour Governs* (1923), Childe obtained, but only briefly retained, a post in the Department of Tutorial Classes at the University of Queensland. In fact it has since appeared that it was the Senate of the University of Sydney which failed to ratify his appointment to a tutorship in ancient history: see J. Allen (1962), a reference for which I am indebted to Professor J. V. S. Megaw. It is nevertheless clear from Jack Lindsay's book (1958: 135-7) that Childe did spend a period in the Brisbane area, presumably when he was holding the clerical job he took up following the debacle: a reference I owe to Mr Peter Gathercole.
- (2) According to the Preface (xii) 'The text was completed in September 1927, but owing to various difficulties final publication had to be postponed until 1929.'
- (3) Re-examination of the red deer bones from Star Carr by Dr Nanna Nøe-Nygaard of the Institute of Historical Geology and Palaeontology of the University of Copenhagen has revealed traces of the use of weapons on Mesolithic herbivores from Denmark. (1974).
- (4) A useful survey of the field is given in Brothwell and Higgs 1969. The importance of this topic has recently been acknowledged in joint discussions between the British Academy and the Royal Society on the funding of research in this field.
- (5) For a pioneer survey, see Gutorm Gjessing's essay 'Socio-archaeology': one of those offered to Kaj Birkett Smith on his 70th birthday (Gjessing, 1963). See also J. G. D. Clark (1972b, esp. 10 ff.).
- (6) Thus in the long sequence at the Haua Fteah in Cyrenaica Dr Charles McBurney discerned 'two major change-overs from one basic pattern of composition to another' in addition to 'lesser changes, implying no more than adjustment of the material culture within the framework of an unbroken tradition'. McBurney was only following convention in equating the former with 'actual ethnic movement involving clear-cut cultural replacement' (McBurney, 1967: 135).
- (7) Nowhere better seen than in the history of the exploitation of plant food in the Valley of Mexico revealed by R. S. MacNeish's excavations (McNeish, 1972).
- (8) Willard F. Libby (1949 and 1970) recalls that the father of Dr J. Arnold, his colleague along with Dr Anderson in the early stages of the research, 'was an enthusiastic amateur archaeologist'. Dr Libby himself had a keen interest in the antiquity of man in the New World.

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SIR ARTHUR JOHN EVANS

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Arthur Evans in the Balkans 1875-81*

by J. J. WILKES

On Thursday 22 June 1882 Arthur John Evans made a brief communication to the Society of Antiquaries of London in which he described some of the more interesting items among a collection of gems he had gathered from the sites of ancient cities in Dalmatia.¹ Two years before, in volume 20 of the *Numismatic Chronicle*,² he had published a significant find of Illyrian coins of the 2nd century BC from Selcë in northern Albania. Later in 1882 Evans delivered 2 papers to the Antiquaries on the ancient history and archaeology of lands east of the Adriatic. The first, read on 30 November, examined the remains of ancient Epidaurum (modern Cavtat, near Dubrovnik); the second, read a week later on 7 December, traced the probable lines of Roman roads across the mountainous country between the Save valley and the Adriatic. Both were published in volume 48 of *Archaeologia* in 1884 as the first two parts of a series entitled 'Antiquarian Researches in Illyricum'.³ These two studies, together with the third and fourth parts, dealing with areas still further east and with the topography of Scupi (modern Skopje) and its territory, delivered in March 1883 and 1884 and published in *Archaeologia* volume 49 in 1885, exhibit a remarkable knowledge of the country and its people.⁴ From the accounts of the prehistoric, Graeco-Roman and early medieval eras, one gains the impression that these studies, occupying more than 260 pages, could have been written only after years of secluded study and patient travel, quite undisturbed by anything which might detract from scholarly research. Yet the truth is quite otherwise. These studies, and the fieldwork on which they were based, originated at a time when the lands east of the Adriatic were in great turmoil, while their author wrote not from a scholarly seclusion but as an active journalist and politician, sometimes at the very centre of the great crisis in European affairs known as the Eastern Question, the problem of the Ottoman Empire in Europe and the aspirations of the Slav, Bulgar, Macedonian, Albanian and Greek peoples included within it. During the years following 1875, when the crisis first developed, Arthur Evans was to become almost overnight an authority on the Balkans, his writings quoted in the speeches of Gladstone and his supporters, secretary of the British fund for Balkan refugees, special correspondent of the *Manchester Guardian* in the Balkans and bitter opponent of the British Foreign Office and its consular representatives; until early in 1882, some time after the worst of the

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crisis was past, he was imprisoned and later expelled by the Austrian authorities. Those who heard Evans' talk on gems from Dalmatia in 1882, in the course of which he merely observed that one 'needs hardly to remind this Society that the lands to the east of the Adriatic, the misfortunes of which alone at present distract to them the attention of mankind, formed under the Roman Peace one of the most flourishing tracts within the limits of the Empire',⁵ will have been well aware that less than 6 weeks before the speaker had been in a cell of the prison at Ragusa (as Dubrovnik was generally known then) awaiting the verdict of an Austrian court which might impose a sentence of up to 20 years.

Arthur John Evans was born on 8 July 1851 at Nash Mills, near Hemel Hempstead in Hertfordshire. His father, John Evans, who died in 1908 aged 84, was distinguished not only as the head of a most successful and famous paper works, established by his father-in-law John Dickinson, but also as an archaeologist whose three major works on British archaeology remained for years fundamental in their fields, *Coins of the Ancient Britons* (1864), *The Ancient Stone Implements, Weapons and Ornaments of Great Britain* (1872, second edition 1897), and *The Ancient Bronze Implements, Weapons and Ornaments of Great Britain and Ireland* (1881). An avid collector and classifier of artefacts, he corresponded with other collectors, while to his house at Nash Mills came a variety of visitors from the world of commerce and scholarship. He combined these two activities so successfully that he was at various times President of the *Society of Antiquaries*, of the *Numismatic Society* (for 34 years), of the *Geological Society*, of the *Anthropological Institute*, of the *Society of Chemical Industry*, and of the *British Association*, and for 20 years was Treasurer of the *Royal Society*. In the splendid biography of her father and half-brother *Time and Chance* (1943), Dr Joan Evans records that the former's political outlook might have been summed up in the trade toast of 'Peace, Prosperity and Paper-making'.⁶ After the death of Arthur Evans' mother Harriet Ann Dickinson in 1858 John Evans married in the following year his cousin, Frances Phelps, who was to be the main recipient of Arthur's letters while he was resident in the Balkans, which record much of the private background to his political and journalistic activities. At the age of 9 Arthur was already assisting his father to dig out Roman pottery from the cliff at Dunwich in Suffolk, and when 15 was allowed to hear his father speak at the Antiquaries. Arthur was sent to Harrow School and in the holidays accompanied his father collecting objects in Northern France. At school he showed signs of near-sightedness, which had the beneficial consequence of keeping him away from games and at the same time enabled him to study very small objects, such as coins and gems. Soon he was exhibiting to his fellows coins from Verulamium and Roman glass from Cologne. In addition to literary activities he would also entertain them during class with his grass snake that would enter at the sleeve and reappear dramatically at the collar!

In many ways different from his father, Arthur Evans had no desire to enter the solid world of Victorian commerce and chose to read history at Oxford but, because he failed to obtain a scholarship elsewhere, had to make do with Brasenose, a college not then noted for its academic traditions. During the long vacation he travelled in Europe,

at times with his younger brother Lewis (who did go into the Mills) and at other times with friends. In finals at the end of 1874 his interests did not coincide at all with those of his examiners, but, nevertheless, they awarded him the distinction of a first class, albeit after long argument. He now sought to achieve an identity distinct from that of his father, though for years to come he never quite escaped being known as 'Little Evans, son of John Evans the Great'. He did not possess the qualities to match his father's simultaneous application to manufacturing and scholarship, but he could instead travel and write. Travel in remote areas soon became his ambition, not in Africa but 'over the marches of civilised Europe'⁷ to the east and south-east of Austria-Hungary, where the land and people were perhaps less familiar to the England of the day than Darkest Africa and the Upper Nile. In 1871 he travelled with Lewis in France soon after the Franco-Prussian war and saw the resulting devastation at first-hand, continuing to southern Europe, pausing to visit Hallstatt near Salzburg, and then on to Carinthia and Carniola (now Slovenia in Yugoslavia) and Croatian Agram (now Zagreb). A brief glimpse of the Turkish town Kostajnica near the border aroused his interest in the land and peoples beyond. Their travel in 1872 was more ambitious, walking through the mountains of southern Transylvania from Petroseny to Sibiu and crossing the mountains into Roumania (without passports), to return home via Bucharest and Belgrade, then capital of the precariously independent Serbia. A visit to Scandinavia in 1873 proved disappointing and served to confirm his interest in south-east Europe: no ghosts of history could be conjured up in Lapland. In 1875 he failed to obtain a fellowship at Oxford and spent some time in Göttingen, where he found the library much more in use than the Bodleian, but reflected on how the lavish promotion of scholarship by the state was matched by an infringement of political freedom. At the end of July he left Göttingen to meet Lewis at Agram for a planned journey through the Ottoman provinces of Bosnia and the Hercegovina to the Adriatic. They travelled throughout August and by early September had reached Ragusa on the Adriatic (see Fig. 1). The brothers' visit to those lands coincided with events there which were soon to have a great effect not only on the life of Arthur Evans but also on the history of Europe.

The two Ottoman provinces of Bosnia (capital at Sarajevo) and the Hercegovina (capital at Mostar), much smaller and normally linked to Bosnia, comprise some of the most difficult and inaccessible terrain in Europe. Beyond the Adriatic coast there is mile upon mile of waterless karst, where underground rivers appear in full spate, only to vanish with equal suddenness. North of the Dinaric watershed are the thickly wooded valleys of Bosnia, whose rivers flow northwards into the Save. Rich in mineral deposits it is a land where the invader, with the exception of the Ottomans, has rarely found the effort of conquest to be worthwhile in the short term, owing to the fierceness of its people. Once the land of the ancient Illyrians, a people whom even the Macedonians to the south and the Thracians to the east found excessively warlike, their resistance to the Romans in the years AD 6–9 gave the legions of Augustus their severest test, much more threatening to the well-being of the Empire than the more spectacular loss of 3 legions in Germany at the hands of Arminius in AD 9. Three centuries later, however, it was a different story



Fig. 1 Journey of Arthur and Lewis Evans across Bosnia and Herzegovina, August 1875.

when a series of determined Illyrian soldier emperors, some of them from peasant families in remote areas, rescued the Empire from military disasters on the frontiers.⁸ In the 6th century Illyricum was overrun by the pagan Slavs, and only a few of the well-protected Roman cities on the Dalmatian coast and on the islands survived under Byzantine rule until, by the 10th century, they had been gradually absorbed by the Christianised Slavs. Christian kingdoms and principalities arose among the Slavs, in Croatia, in Bosnia and above all in Serbia. In the 14th century the Serbian ruler Stephen Dušan, seeing the weakness of Byzantium in the face of Ottoman expansion, sought to create a Serbo-Greek Empire to defend the Balkans. On Easter Day 1346 he was crowned emperor at Skopje, and his famous Law Code published 3 years later shows his people barely less advanced than the major powers of Europe. Stephen died in 1355 and by 1371 his Empire had collapsed. In 1389 the Ottomans invaded the Balkans and overran Bulgaria, and on 15 June of the same year destroyed the Serbian forces in the battle of Kossovo, an event which the Serbs have never forgotten. Their bards (*guslari*) still sing of that day, on which both the Czar Lazar and the Sultan Murad I were killed, about the treachery of Vuk Branković and the heroism of Miloš Obilić who killed the Sultan. By 1483 Bosnia and the Hercegovina had been conquered. Here the resistance of the population had been undermined by the pope's ruthless measures against persistent heresy in the area. The feudal nobility passed over to Islam rapidly and were soon followed by many of their peasants. As a result the population has remained divided three ways, between Moslem, Serbian Orthodox and Western Catholic (in 1874 the respective totals were 400,000, nearly 600,000 and nearly 200,000, in a total population of 1½ million). For all purposes sealed off from the outside world, the exploitation of the peasantry increased, while the intense patriotism of the local nobility successfully resisted all attempts at reform emanating from Stamboul. Their religious fervour for Islam was also sustained by the long military frontier created by the Austrian Hapsburgs on the north and west, and by the recurring struggles with the undefeated Montenegrins in the south. Little was changed during 5 centuries. In 1831 the Bosnian nobles (the Beys) rose against the reformers but were finally crushed in 1851 by the Croat renegade Omer Pasha. The peasants were now being driven to a state of desperation, while wars in 1858 and 1862 showed the Montenegrins successfully resisting the full power of the Sultan. In Serbia Prince Milutin began to aspire to the leadership of all the Southern or 'Jugo' Slavs, while the movement for Slav unity under the Hapsburgs gained ground in Croatia and in Dalmatia. The Austrian governor in the latter province, Baron Rodić, favoured this sentiment and early in 1875 he engineered a visit to Dalmatia by the Emperor Francis Joseph which raised Slav hopes, as well as causing damage to a number of historic monuments through the necessary widening of roads and gates.

In July 1875 Christian peasants in the more remote areas of the Hercegovina, around Nevesinje, Gačko and Stolac, rebelled once again against their oppressors.⁹ In spite of great efforts by the Beys and their irregulars, and the regular Ottoman forces, the rising quickly spread throughout both provinces. The great powers of Europe soon detected a crisis and began to make their own calculations: Russia, ever eager to move

against the Ottoman Empire, enjoyed the emotional support of many Slavs, while at the same time fearing their revolutionary and generally democratic traditions; Austria-Hungary fearful of Russian power in the Balkans but at the same time with powerful groups, notably the Magyars, unwilling to contemplate any large increase in the Slav population of the Empire; while diametrically opposed to Russia was Great Britain, who could be relied on to resist any move to dismember the Ottoman Empire in Europe, not least because of her suspicions of Russian designs on India, a likely area of conflict uncomfortably remote from the guns of the Royal Navy.

On their return to England in September 1875 Lewis went back to his work at Nash Mills while Arthur returned to Oxford to try for a fellowship, which he again failed to obtain. Instead, he wrote up the notes he had made during the journey and added a long historical introduction.¹⁰ The book was published by Longmans (with a subsidy from the author) in June 1876 with the remarkable title of: *Through Bosnia and the Herzegovina on Foot during the Insurrection, August and September 1875, with an Historical Review of Bosnia, and a Glimpse at the Croats, Slavonians, and The Ancient Republic of Ragusa*.¹¹ In normal times a rather over-written narrative of travel across a small part of Turkey-in-Europe, even when it contained much first-hand information about the causes of rebellion by an oppressed peasantry, would not have drawn a great deal of attention to the author. However, its publication preceded by a matter of weeks the first reports of horrific atrocities in Bulgaria, where another rebellion had broken out within the Ottoman Empire from similar causes, though with much more political co-ordination. By August 1876 meetings to protest at 'the ill-treatment of oppressed Christians by the fanatically Moslem irregular soldiers of Turkey' were being held throughout Great Britain, reaching a climax in the autumn. Then the role of leading Atrocitarian was accepted by Gladstone, the former prime minister who had retired from public life following his electoral defeat in 1874 at the hands of Disraeli and the Conservatives, hoping, he asserted, for an 'interval between Parliament and the grave'. From Gladstone downwards the Atrocitarians seized upon Evans' book as an honest and first-hand description of how the Christians were being oppressed, the sort of information which, they maintained, never reached the Foreign Office through the Turkophil ambassador at Constantinople and his consul at Sarajevo. Passages from the book were quoted in many speeches, with the result that in the matter of a few weeks Arthur Evans became an authority on the Balkans — 'after a month's travel and a single book'.¹²

Based on notes made during the journey, which had to be dramatically curtailed as the rebellion became more widespread, the book is a remarkable mixture of traveller's record, political tract, archaeological survey and ethnographic treatise. With illustrations from his own sketchbook, details are given about all manner of customs, dress, domestic and agricultural implements, houses, animals, settlements, wild life, and individuals encountered — both friendly and hostile, all mixed in with reports of the spread of the rebellion and tirades against the oppression of the Beys. In spite of its serious content there is much humour, and more than once Evans makes fun of his own behaviour, as, for example, on the occasion when, arrested on the Turkish frontier by the Austro-

Hungarian authorities, he threatened the population of the small town of Brod with a vision of the British Fleet sailing up the river Save.¹³ Some of the chapter subheadings might suggest a rather frivolous traveller with a taste for over-dramatising even quite ordinary encounters, but this is a misleading impression and there is much serious comment and perceptive analysis, which influenced readers in England. He offers a clear and sober account of how the rebellion started. Elsewhere he will criticise the behaviour of the Bosnians: 'Nature's gentlemen the Bosniacs certainly are not. They show themselves grossly familiar when not cowed into bearish reserve; they have not even sufficient tact to perceive when their impertinence or obtrusive curiosity is annoying. They never displayed gratitude for any small largess that we bestowed on them, though they grabbed at it with avidity'. 'On the other hand,' Evans continues, 'it is part and parcel of a democratic habit of mind common to the whole Serbian, and indeed the whole South-Slavonic race.' He ends the digression with a judgement that reveals remarkable foresight: 'for one need not be enamoured of liberty coupled with equality and fraternity not to perceive that, when the choice lies between it and tyranny, freedom, even in such companionship, is to be infinitely preferred; and a man must be either blind or a diplomatist not to perceive that in the Slavonic provinces of Turkey the choice ultimately lies between despotism and a democracy almost socialistic.'¹⁴ On a political level he offers some advice and warnings for future British policy in the area, revealing a more subtle understanding than many of the Atrocitarians, to whom the whole issue was simply one of Christians against Moslems. 'The whole history of Bosnia from the beginning has been one long commentary on the evils of established religions. Whatever terms the Great Powers may wish to impose on Bosnia and the Turks, let England at all events exert her influence against the setting up of an ecclesiastical tyranny. Let a European guarantee secure to the Mahometan minority of Bosnia the free exercise of their religion and complete equality before the law, and half the battle of conciliation will have been won. But let it once be supposed that Greek popes under the tutelage of Russia, or Franciscan monks under the patronage of the Apostolic Monarchy which still sets at nought, in Tyrol, the first principles of religious liberty, are to be allowed to lord it over the true believers; once encourage the hopes of Christian bigotry and the fears of Islam, and the miserable struggle will prolong itself to the bitter end.' And, for a political solution: 'Why not, then, sever the connection with that sink of corruption (Stamboul) altogether, and erect an independent state under a European guarantee? The democratic genius of the people would suggest a Republic as the best form of government, but the divided state of the country would preclude such a government to begin with; and a Principality, after the model of Free Serbia, might combine parliamentary government with the coherence of a monarchy.'¹⁵ Such proposals are supported with remarks about the great mineral wealth of Bosnia in Roman and medieval times, then wholly unexploited, a resource which was bound to assure the future well-being of his proposed state. Perhaps the best tribute to the historical and archaeological qualities of the book came from Edward Augustus Freeman, the famous historian and Evans' future father-in-law: 'I am reading your book more carefully than I did before. How you notice everything; things about fiddles and

pots, which I should never think of, and things about noses and eyes which I always wish to notice but don't know how. The more things that are noticed the better.'¹⁶

While the publication of his book furnished important testimony for public speeches by others, Evans himself was not personally involved in the agitation. During the journey in 1875 he had met the remarkable English lady Miss A. P. Irby who for some years had lived in Sarajevo organising schools and welfare in the Christian villages of the surrounding area.¹⁷ When the rebellion began she moved outside Turkish territory to Knin in Dalmatia, in order to organise relief among the Bosnian refugees. Later, when Bosnia had passed under Austrian rule she returned to Sarajevo and remained there until her death on the eve of the First World War, a devotion still commemorated by one of the street names in modern Sarajevo. In addition to reviewing books on the Balkans, Evans became secretary of the relief fund organised by Miss Irby.¹⁸ In Oxford John Evans' old friend Joseph Prestwich had recently come to occupy the chair of Geology, and through his help Evans was able to return to the Balkans. Prestwich's nephew C. P. Scott had recently become editor of the *Manchester Guardian*, a strong supporter of Gladstone and Slav freedom. He accepted Evans as the Balkan correspondent of the paper based at Ragusa, a place to which Evans had already become devoted. He arrived in Dalmatia in January 1877 and went to Miss Irby's refugee camp at Knin bringing aid from the English fund for the thousands of refugees already there. In the two books of presscuttings now in the Ashmolean Museum are more than 200 despatches and articles written for the paper between February 1877 and September 1881. Some are brief telegraphed messages of news not only from Bosnia and the Hercegovina but also from Montenegro and Albania, where he also travelled and reported as new crises developed around the fringes of the disintegrating Ottoman power. He soon became a familiar figure at Ragusa, 'the mad Englishman with a walking stick', whose activities were regarded locally with an amused tolerance, in spite of the fact that many were convinced he was Gladstone's secret agent to the insurgents, handing out bags of gold to visitors at the dead of night (Plate 2). In England, meanwhile, some of Evans' longer articles had a sensational impact and were exactly what the editor was hoping for. Detailed reports of massacres, often supported by the testimony of named witnesses, in Slav villages in north-west Bosnia, which Evans himself visited, were accompanied by harrowing descriptions of the wretched condition of the refugees and accounts of visits to the organised camps of the insurgents in the high mountains. Readers in England were told of 145 villages burnt in southern Bosnia, of old men, women and children murdered by the terrible irregular troops serving the Beys. The conduct of these was not only beyond the control of, but largely unknown to, the Ottoman government in Sarajevo. To make this point Evans described some of the farcical attempts to introduce new constitutions or reforms of justice in such areas.

The British consul in Sarajevo was W. R. Holmes, with 40 years of experience in the service. His reports to the Foreign Office reflected the Ottoman view in Sarajevo (in which there was some measure of truth), that the troubles in Bosnia were for the most part caused by 'brigands from outside the territory'. When questioned in the House of



ARTHUR JOHN EVANS
1878

Plate II. Reproduced from *Time and Chance* by kind permission of Dr Joan Evans.

Commons on 9 March 1876 about the very different version reported by the *Manchester Guardian* correspondent, a government spokesman quoted from a despatch of consul Holmes: 'all the unemployed and needy Slav patriots, aided and encouraged by Slav committees, will find their way into Bosnia and cause a renewal of the brigandage on a scale which ... it has pleased Slav sympathisers to call "insurrection".' To this Evans replied in the *Guardian* that 'the despatches of consul Holmes surpassed any I have seen in perverse ignorance and unconscious partisanship'. By contrast his own articles were written by 'an Englishman who knows the language, which Mr Holmes does not', while the causes of the uprisings were 'the flagrant and unendurable tyranny of the Beys and their aiders and abettors the Osmanli officials.' Following a particularly convincing account by Evans of a massacre at Očievo in north-west Bosnia, the Foreign Office ordered the vice-consul Freeman to make an investigation, but he himself admitted that a European consul could never discover the real facts. A modified version of his report was published in order to discredit Evans, who replied with a devastating rebuttal in the *Guardian* on 11 July, followed by a long piece entitled 'the reign of terror in Bosnia'. He accused the British consul of urging the provincial government to send more and more forces to crush the 'brigands', causing a huge exodus of Christian Slavs into Austrian territory. In the autumn of 1877 a new series of articles continued the story of misery and devastation, in reply to another government defence of consul Holmes in the House of Commons. The official response to these was a knighthood for the consul at the end of the year.¹⁹

From the time of his first contact with the Balkan lands and their peoples Evans was strongly sympathetic towards the aspirations of the Slav peoples. At the same time he became fascinated by the traces left by the many peoples, languages and religions, to which the area had been exposed. He was an eye-witness of the struggles between the Mahometan landowners and their Christian peasantry, soon to be at least partly resolved by an Austrian occupation of Bosnia and the Hercegovina, sanctioned by the Great Powers at the Congress of Berlin in July 1878.²⁰ Behind these events Evans could see the pattern of earlier struggles, those of Orthodox, Catholic and heretic Christians, pagan Slavs, Romans and ancient Illyrians. From outside, their connections with neighbouring peoples, French, Italians, Germans, Magyars, Venetians and Ragusans were also obvious. It is not to be wondered at that he was eager to visit 'the other side', the Bosnian Beys who were the enemies of those whose cause he was supporting by his reports to England. He had managed to meet the leaders of the insurgents, Uzelatz and Despotović, but was disappointed to discover that they seemed to draw their inspiration from outside Bosnia, mainly from Serbia and even Russia, while the only source he found for the traditions of pre-Ottoman Bosnia was a Bosnian Mahomedan prisoner of the insurgents whom they employed as a secretary. Evans' visit to the stronghold of the Bosnian Beys at Kulen Vakuf (Vakup) in the remote Una valley (Fig. 2) is perhaps the most extraordinary episode of all his travels in the area.²¹ The insurgents did not believe that a Christian, let alone an Englishman, could go there and survive. Nevertheless he managed to send a letter there saying that he was eager to meet them, but before he came he would have to have a

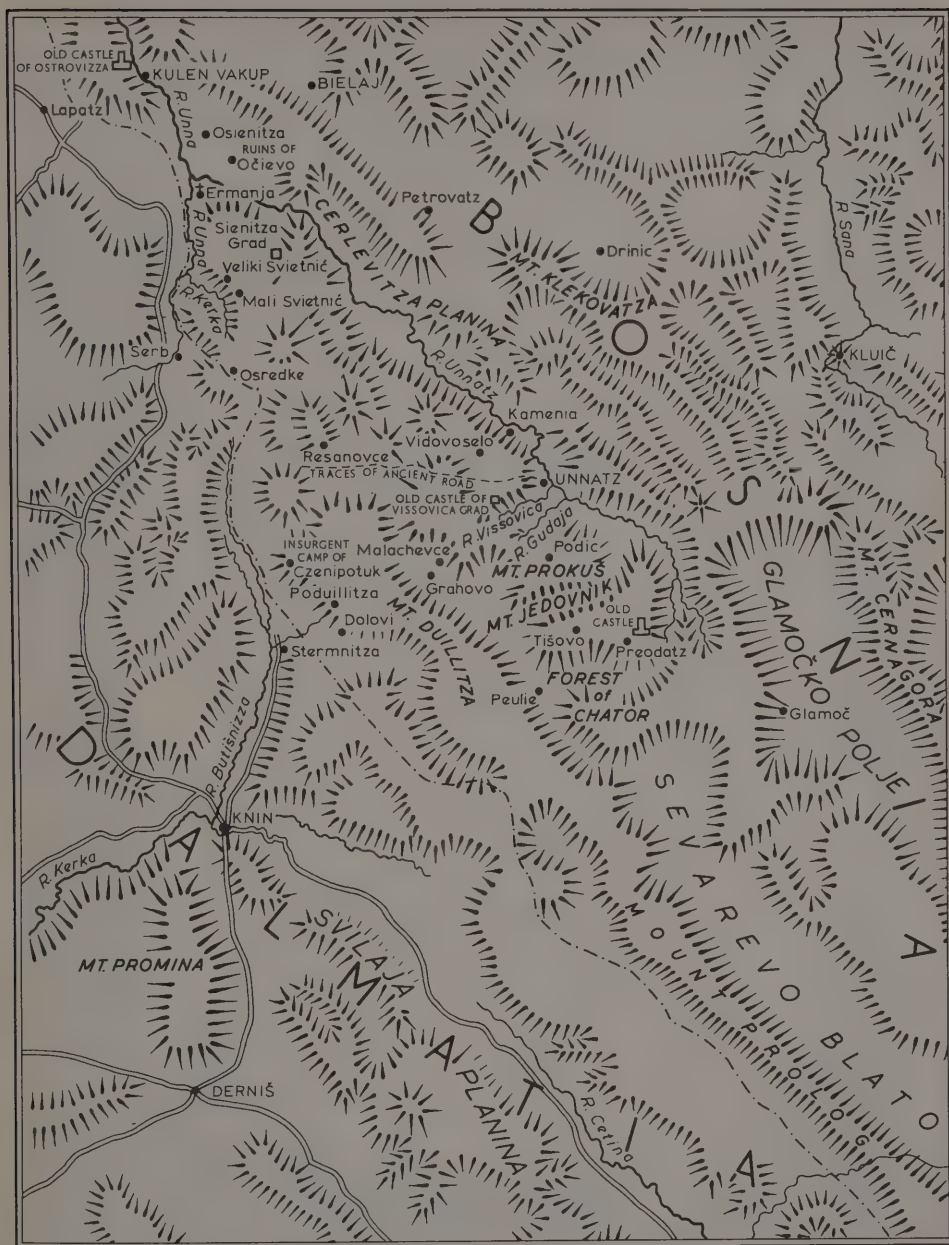


Fig. 2 Map of insurgent area of northwest Bosnia.

guarantee for his safety. The letter was received by the Beys, who had been virtually cut off from the outside world by the uprisings for two years, in the belief that Evans was an ambassador to them from the Great Powers of Europe, sent as their saviour against the insurgents with the approval of the Sultan himself. When he returned to his base at Lapac after further travel, Evans found his friends very excited because a reply had been received. Written in the very difficult old Bosnian Cyrillic script the original letter has come to light (Plate III) among a collection of Evans' Balkan notebooks and other papers now in the School of Slavonic and East European Studies of our University.²² On the outside of the sealed and folded paper was written 'This letter is to be given to the Czar of England and Evensa Artura', and inside was the following communication: 'The Mudir of the Ottoman Czar at Vakup to the king of England and Evensa Artura. I have received your letter, conveyed to me by George Pavičić, and I have understood what you write to me, that you would willingly come here to Vakup as Imperial ambassador, but that, in spite of this, you have heard that there are ill-intentioned persons in this town. I assure you that those who are telling this are untruthful. Our intentions are friendly, and for him who comes in the name of the two Empires let there be no fear.' Amazed by the lofty tone of the invitation Evans went directly to Kulen Vakuf, where many of the leading Bosnians had gathered to meet this 'ambassador'. The entire population of the town came out to welcome Evans who was escorted by a group of fierce irregulars; he was wearing for effect a red-lined cloak turned inside out, which he had bought during the visit to France in 1871, and which he had proceeded to don in spite of a gendarme's warning that he would be 'fusilé comme un chien'.²³ His interviews with the Beys proved inconclusive. When he asked what they were willing to do in order to improve the lot of their Christian peasants, they offered no concessions. 'Will you take more from them,' Evans asked, 'if they return?' 'No,' was the curt reply, 'we will not take more but their lot will be worse.' 'Property is property,' added another. This was countered by a brief address on the enlightened squirearchy in England.

This adventure, from which Evans acquired a lasting respect for the courage of the Bosnian Mahomedans, caused some anxiety among his friends. The famous traveller Richard Burton, then British consul at Trieste, wrote to him not long after the visit to the Beys, on 24 May 1877: 'You possibly have heard that I have just returned from Egypt and Arabia after a most interesting wander among the gold mines of Old Midian. ... But do mind where you travel! I don't consider myself an over-prudent man in such matters, and yet I should not think of venturing into the mountains of Yemen, held by the Turks.'²⁴ In the middle of the year Evans began excavating some prehistoric burials near Ragusa²⁵ but after only three days' work with 15 men war broke out between Turkey and Montenegro, which required him to visit the capital of the small Slav principality at Cetinje. In the intervals between the fighting he was able to meet the historian E. A. Freeman, whose daughter Margaret Arthur married in the following year, to help Miss Irby with her refugees at Knin, and even to resume the interrupted excavations, a project in which his cousin Arthur Hubbard found himself hard at work, although he had actually come from England in order to comfort the refugees. In September the war

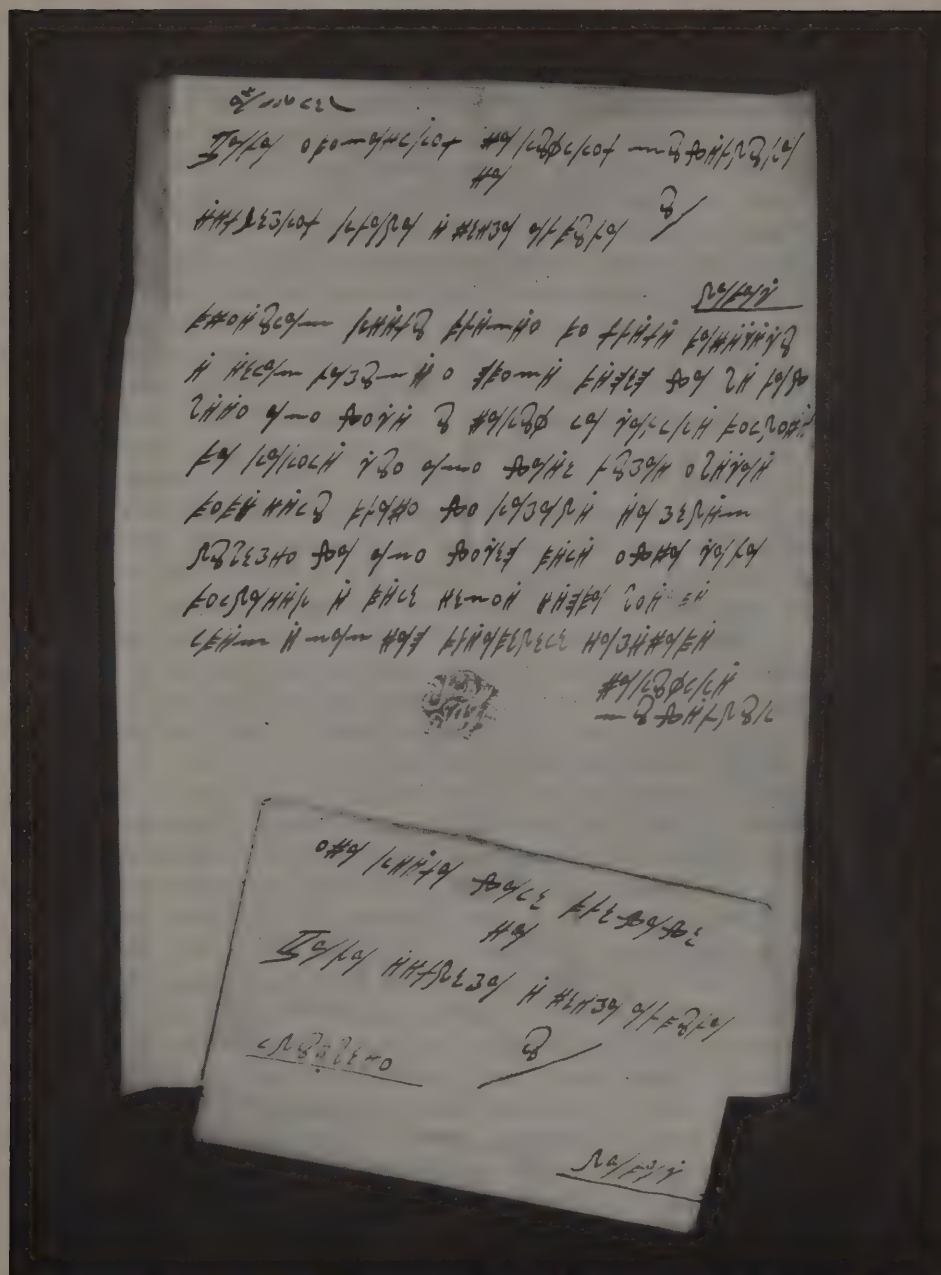


Plate III Letter of the Bosnian Beys addressed to Arthur Evans in April 1877. Reproduced by permission of the School of Slavonic and East European Studies, University of London.

flared up again and Evans travelled to Nikšić (the old Serbian Onogost) within a few days of its capture by the Montenegrins.²⁶

Evans returned to England in November 1877 and prepared a republication of some of his longer reports to the *Manchester Guardian*, which appeared early in the following year with the title *Illyrian Letters*.²⁷ The foreword he wrote to the volume offers a clear picture of how Evans' archaeological researches and his political activities were closely connected: 'It has been my own object to take a rather comprehensive view of all the Illyrian Provinces, and by extending my observations from the Save to Central Albania to survey them from a variety of standpoints. And in doing so I have not considered the scenery of those countries, their antiquities, and even the folklore and domestic life of their peoples, beside my purpose. I have often deliberately preferred to lead up to political conclusions by such apparently indirect channels. It is practically impossible to separate peoples as primitive as the inhabitants of those lands from their surroundings. Where man is ignorant, Nature still is his mistress. The broad distinctions between politics and the relations of domestic life that exist among civilised nations are out there non-existent, and even the nymphs and dragons that haunt the Bosnian caves and forests may, in their way, play as real a part in the affairs of men as Insurgents or Bashi-Bazouks. Nor should anyone who desires to present the "Illyrian Question" adequately before the world fail at least to touch upon the antiquities of those historic lands, where the monuments of the Past present the weightiest protest against Present ruin, and form the true mirrors of the future. My letter about Durazzo is thus largely occupied by antiquarian suggestions and historical reminiscences which point their moral: yet while glancing at those topics I have purposely reserved for other occasions any disquisitions that might be called archaeological.'²⁸

Evans had found a supporter in Freeman for his work in the Balkans, although the latter's extreme denunciations of the British government and its ambassadors could be counterproductive before an English audience.²⁹ He was delighted when Evans' engagement to Margaret Freeman was announced, but was alarmed by Evans' intention to reside permanently in Ragusa. In March 1878 Evans was back in Dalmatia, visiting Miss Irby and the refugees at Knin, and later moved to Northern Albania, where the impending Austro-Hungarian occupation of Bosnia had aroused the Albanians, afraid that they would be sacrificed to the ambitions of Montenegro, behind whom was the power of Russia. The planned entry of Austrian forces into Bosnia in August drew Evans north to the Save valley, but he could make few contacts with the Austrian authorities whose treatment of the liberated Slavs he disliked more and more intensely.³⁰ He returned to England for marriage to Margaret Freeman, but they were in Ragusa before the end of October, planning to set up house a few hundred yards along the shore south of the old city, his Casa San Lazzaro. Margaret was ill for some time after their arrival, but Evans was happy to visit the refugees at Knin, to get away from Ragusa which was now full of Austrians preparing for the annexation. He visited Kulen Vakuf again and reported how the Austrians were demanding the payment of taxes at the old crippling rates.³¹ There even appears to have been some talk of Evans becoming consul at Ragusa, but, even

though Gladstone was back again as prime minister, it would have been impossible to appoint a journalist whose views had already antagonised Vienna. With the *Manchester Guardian* now less receptive to news from Dalmatia and Bosnia, Evans began to plan his history of the Illyrian lands, and by the middle of 1880 he was spending more time on the study of sources, which he was now able to combine with an extensive knowledge of the country. He became friendly with an Austrian army surgeon at Ragusa, Felix von Luschan, later director of the Museum für Volkskunde in Berlin, whose collection of 900 skulls Evans supplemented by various means.³² He now planned journeys to lands east of Bosnia, still under Turkish rule, to the Sandjak of Novi Pazar, Old Serbia, Macedonia and Salonica. Although disturbances were still continuing in Bosnia, outspoken reporting was now out of the question from Austrian territory,³³ and Evans began to entertain ambitions of a consular post in Montenegro or even somewhere to the east even more remote, a notion which distressed his wife and alarmed his father-in-law. Evans' position at Ragusa was becoming dangerously isolated, especially now that Gladstone had publicly assured the Austrians that he did not wish to allow past events to affect future friendly relations.³⁴ The increasing threat from the authorities drew a remarkable warning from his friend von Luschan, in the form of a 'Greek Inscription',³⁵ supposedly found at Olympia on 7 May 1880 (Plate IV): 'Please take care. Don't publish any political things just now. You are carefully watched by I don't know whom. But the Ministry of Interior has even wanted your "Ausweisung". Only Hemerle has most decidedly opposed himself. He said also to me that as long as he was min(ister) there would be no idea of agitation against an English scientific man. Also general Klimbourg has sent a highly favourable letter for you. But please moderate yourself.' Back in England, the family at Nash Mills were beginning to be seriously concerned at his obsession with the rights and wrongs of Balkan affairs. Outspoken letters from Evans in Albania now began to reach the *Manchester Guardian*, and the Austrian consul at Scutari, in the middle of this now very unstable area, reported that Evans was in the pay of some Slav government. At the same time, with the outbreak of trouble in South Africa, the English public was becoming less interested in the Balkans. Ironically, now that Arthur Evans was in regular contact with Slav leaders throughout the Balkans, the *Manchester Guardian* had little space for their Ragusa correspondent.

In the summer of 1881 Evans began to make contact with groups of insurgents whose activities were becoming a serious embarrassment to the Austrian authorities now established in the Hercegovina, and who wished to stop any reports from reaching the European press. In the autumn, when Evans was back in Ragusa after travel in Bosnia, Old Serbia and Macedonia, a serious insurrection broke out among the mountain peoples of Krivošćia, near the Gulf of Kotor, caused by the imposition of military service. Evans deliberately visited the insurgents around Ubli, and telegraphed his reports to Manchester via Udine in Italy, which lay outside Austrian censorship. Early in 1882 more risings occurred in Hercegovina, in the same areas where it had all begun in 1875. Warnings now reached Evans from all sides, including one from Burton in Trieste, while it was hardly reassuring to receive a letter from his father-in-law, who was on the point of departing

ΠΛΕΛΣΕ ΤΑΚΕ ΚΑΡΕ
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 ΝΟΩ. ΥΟΥΥ ΑΡΕ ΚΑΡΕ ΦΟΥΛΛΥ
 ΨΗΤΛΕΔ ΒΥ Ι ΔΟΝΤ ΚΝΟΩ ΨΟΜΕ
 ΒΟΥΤ ΘΕ ΜΙΝΙΣΤΕΡΥ ΟΦ ΙΝΤΕΡΙΟΡ
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 ΟΠΠΟΨΕΔ 'ΙΜΣΕΛΦ. ΨΕ ΣΑΙΔ ΑΛΣΟ ΤΟ ΜΕ
 ΘΑΤ ΑΣ ΛΟΝΓ ΑΣ ΨΕ ΨΑΣ ΜΙΝ. ΘΕΡΕ
 ΨΟΟΥΛΔ ΒΕΝΟ ΙΔΕΑ ΟΦ ΑΓΙΤΑΤΙΟΝ ΑΓΑΙΝΣΤ
 ΑΝ ΕΓΓΛΙΣ^Η ΣΣΙΕΝΤΙΦΙΣ ΜΑΙ. ΑΛΣΟ ΓΕΝ.
 ΚΛΙΜΒΟΥΡΓ ΨΑΨΕΝΤ ΑΥΓΛΥ ΦΑΨΟΥΡΑΒΛΕ
 ΛΕΤΤΡΕ ΦΟΡ ΥΟΥΥ. ΒΟΥΤ ΠΨΕΛΣΕ ΜΟΔΕ
 ΡΑΤΕ ΥΟΥΥΡ. ΣΕΛΦ.

Antike Inschrift, gefunden
 bei Olympia am 7. Mai
 1880.

Plate IV Warning of danger in the form of a Greek Inscription sent to Evans at Ragusa by Felix von Luschan. Reproduced from *Time and Chance* by permission of Dr Joan Evans.

for a lecture tour in America, which advised in the event of trouble: 'Don't trust to ambassadors. Telegraph straight to Gladstone. If they harm you it will be another Jenkins' ear.' Evans' freedom came to an end on 7 March 1882, when he was arrested on the quayside at Ragusa in the presence of the British consul.³⁷ A bystander was heard to remark 'Schweineri'. In a small cell of the old Ragusa prison, with Condannati over the door, at first without light or outside communication, he was accused of conduct 'hostile to the Austrians', referring specifically to subsidies and visits paid to insurgents. In England, two days later, Charles Dilke replied for the government to a question in the House of Commons that 'Evans had been very imprudent'. Moreover Evans' political hero Gladstone was well aware that any public protest to Vienna would be compromised by the Irish Americans imprisoned in Ireland. Members of the Evans family came to Ragusa as a support for Margaret, who was also being interrogated. While Evans read *Jane Eyre* in his cell the Austrians arrested a number of politicians and, on the advice of the British consul, Margaret Evans planned a permanent return to England. Through discreet contacts in Vienna the order for his release was obtained and on 23 April 1882 Arthur Evans left Ragusa, not to return there until 1932, by which time it had become Dubrovnik in an independent Yugoslavia.

It is truly remarkable that against such a background Evans could assemble and organise the materials for a series of studies which still form the major source for archaeological information about some of the areas of Illyricum. For insight and intelligent conjecture his writings compare with any of those who followed him. This may perhaps be best indicated by a brief review of the *Antiquarian Studies*, with special attention to what has since been learned about the sites and problems he discussed. Some of the places, on or near the Adriatic coast (Fig. 3), were already described in the accounts of Renaissance travellers, including Cyriacus of Ancona who visited Ragusa in 1435 during his voyage to the Levant.³⁸ A few miles south of Ragusa the small coastal settlement of Old Ragusa (Ragusa Vecchia, now Cavtat) had generally been identified as the site of Epidaurum, a Roman *colonia* settled by Caesar, or at least not long after his death. When the Roman inscriptions of Dalmatia were published by Theodor Mommsen, in volume III of the *Corpus Inscriptionum Latinarum* (1873), it was argued that the site of the original *colonia* lay at Prevlaka, some distance to the south near the entrance to the Gulf of Kotor.³⁹ By the discovery of an early tombstone of a colonial magistrate at Cavtat, together with the remains of an aqueduct and baths and a variety of small finds pointing to the existence of an early settlement, Evans was able to re-establish the *colonia* at Cavtat, while ruling out Prevlaka by careful inspection of the site.⁴⁰ In the valley of Konavle which lay behind the city he located another record of a magistrate, from which, together with the discovery of the aqueduct running through the area, he was able to argue that all the land was part of the original colonial *territorium*, a point now confirmed by aerial photographs showing traces of Roman centuriation.⁴¹ No doubts surrounded the location of Illyrian Rhizon, the later Roman city Risinium (modern Risan) in the north-west of the Gulf of Kotor, but Evans described the site and located the centre of the Roman settlement, and virtually nothing has been recorded there since, with

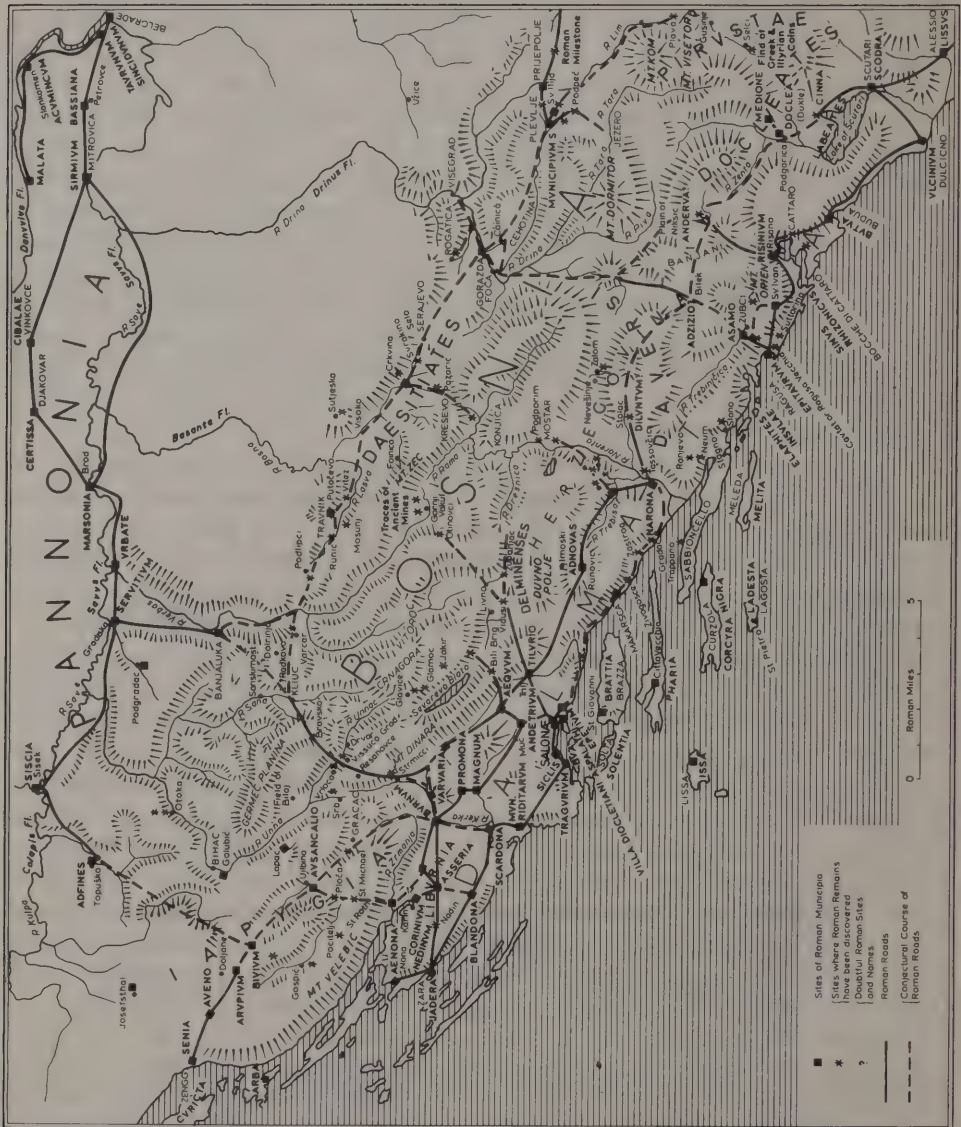


Fig. 3 Roman roads and settlements in Dalmatia (from Antiquarian Researches).

the exception of the now fully uncovered mosaics to which he may have alluded briefly in his account.⁴²

In the hinterland of the Dalmatian coast there existed two legionary fortresses. On the remains of Burnum Evans had nothing to add to what John Strange had written in *Archaeologia* in 1775 from information supplied by the Abbé Fortis on the famous standing arches (Plate V) of the *principia*,⁴³ but at the other site, Gardun, which was occupied during the early part of the 1st century AD by the Seventh legion, Evans was able to refute the notion that it was the native settlement of Delminium, the eponymous capital of the Delmatae captured and destroyed by the Romans in 155 BC. He stressed the obvious legionary character of the monuments on the site, while at the same time suggesting a location for Delminium at Županac in Duvjansko Polje, where the native settlement and later Roman city has since been located.⁴⁴ The Roman colony Narona lay near the mouth of the river Neretva, on a conical hill now occupied by the village of Vid, in the walls of whose houses many Roman inscriptions are still to be seen. In the early years of the *colonia*, the wealthy class of freedmen played an important role in the life of the city through a commercial association named after the traders' patron deity Mercury (*Mercuriales*).⁴⁵ A fine head of this god in Aegean marble (Plate VI) was obtained from the site by Evans – in exchange for a fine top hat made by Lock's of St James Street (mainly to release the hat box as a suitable container for it). The head has recently been given to the Ashmolean Museum by Dr Joan Evans, who writes that she can remember as a child feeling traces of the wax with which the surface of the head had been endued.

Perhaps the most lasting part of Evans' works was the tracing of the major Roman roads across the region. Both the Antonine Itinerary and the Peutinger Map record a main road between Burnum and Siscia (Sisak) in the Save valley, across the mountains through the Lika and the Kupa valley. There are two possible crossings of the mountains between Burnum and the Lika, but Evans' preference for the more easterly line along the Zermanja valley through Gračač now appears to have been correct. He comments that: 'This is far from denying that there was an alternative road from Liburnia into Iapygia by way of the *municipium* that apparently occupied the site of the present Obrovazzo. It stands to reason indeed that this line of communication was known to and used by the Romans. All that I have been maintaining is, that the *natural* route from Burnum towards Siscia and Senia would run through the easier pass of the Zermanja. I am, personally, well acquainted with both routes.'⁴⁶ It was indeed by the former route that in 1877 Evans had tried to conduct wagons of relief supplies for refugees into the Hungarian province of Croatia, though the Magyar authorities turned them back at the border on top of the pass.⁴⁷ In the south, no less important was the tracing of the road inland from Epidaurum (Fig. 4) through remains of a causeway and a Claudian milestone, a route followed later by the merchants of Venice and Ragusa.⁴⁸ That road was merely a branch of the main highway down the Adriatic, linking North Italy, Dalmatia and the Via Egnatia in Macedonia (recently described by Professor N. G. L. Hammond in the first volume of his work on Macedonia).⁴⁹ Travels through the battlefields of the Hercegovina and Monte-

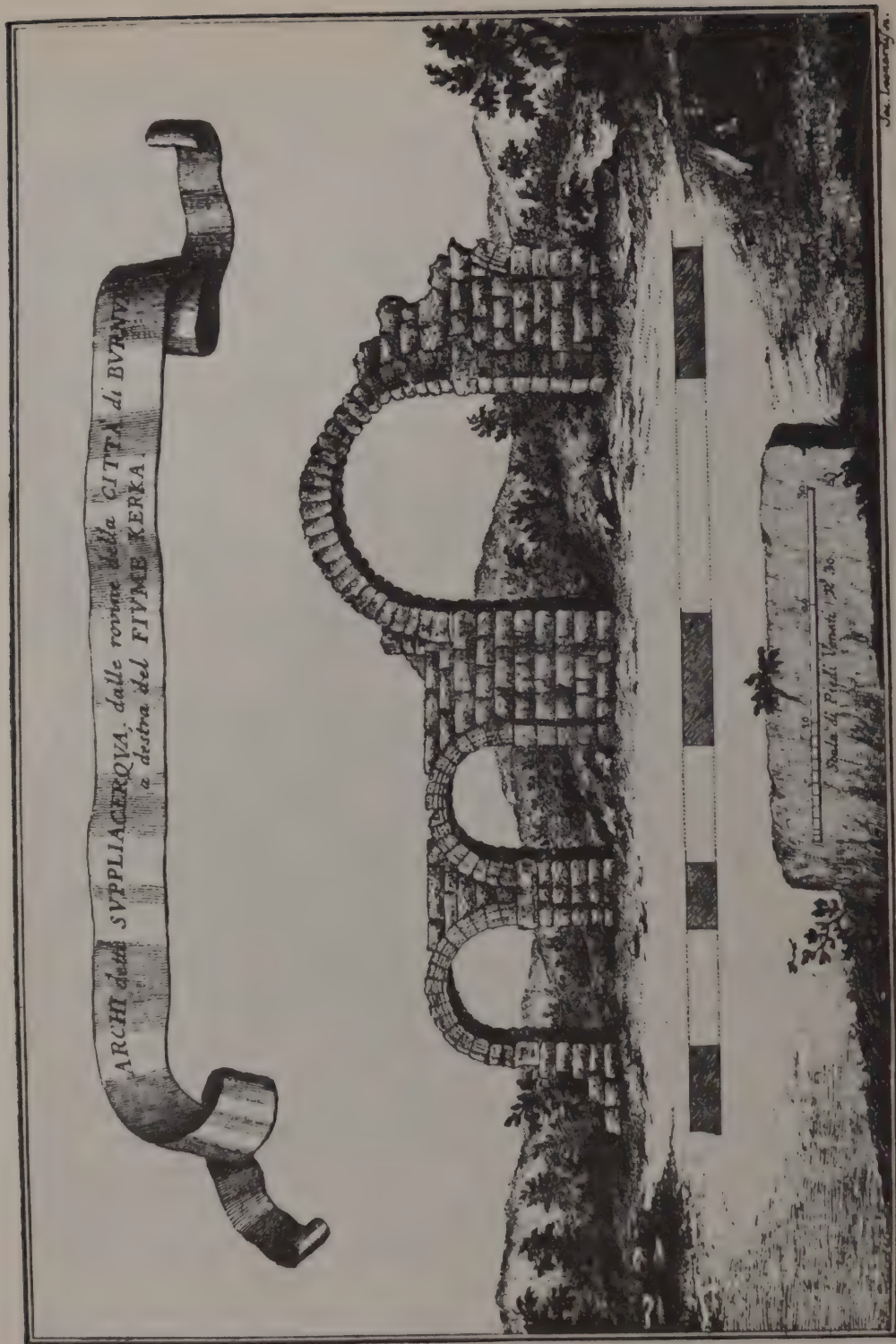




Plate VI Marble head of Mercury obtained by Evans from Naron. Now in Ashmolean Museum, Oxford, whose photograph is reproduced by permission.

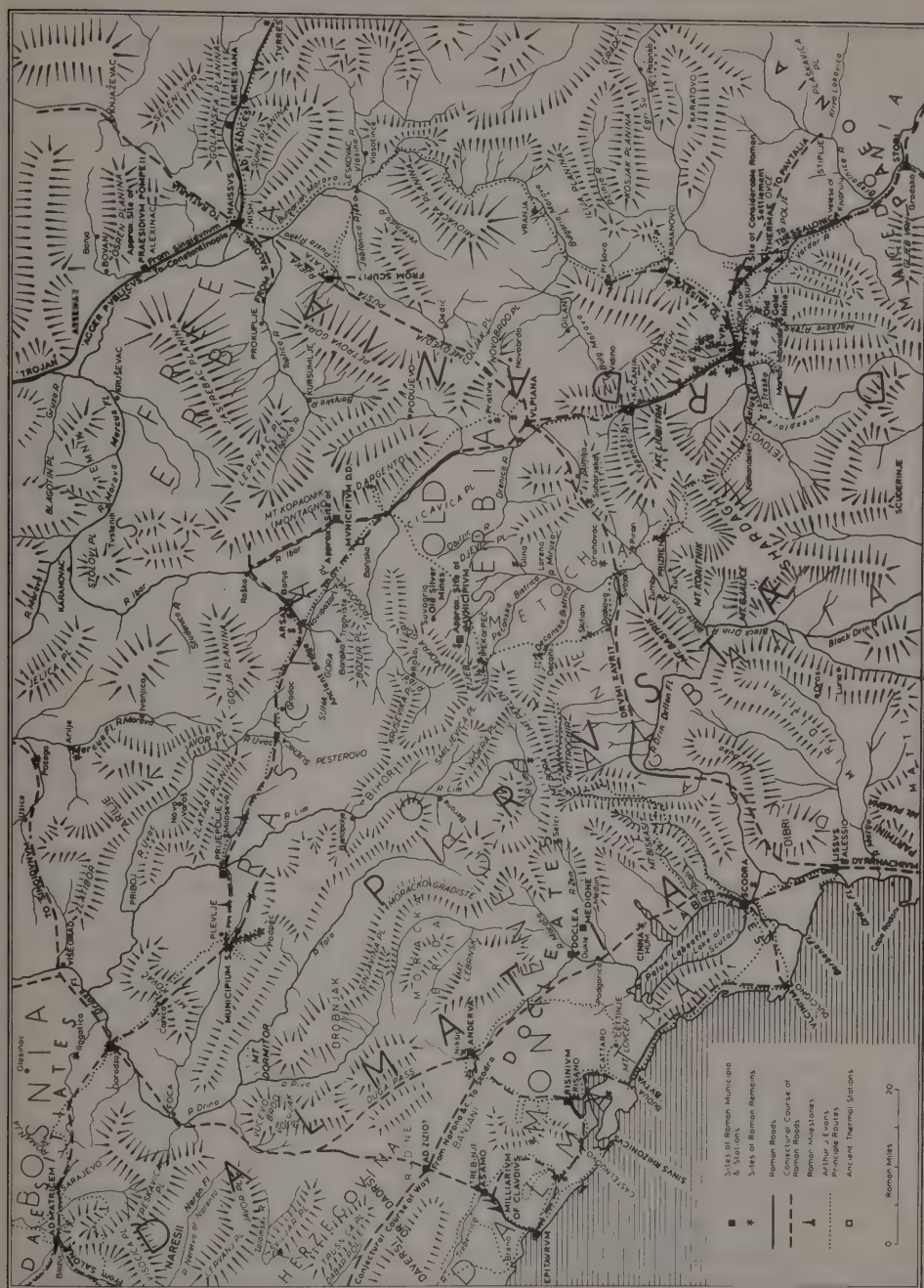


Fig. 5 Roads and Settlements in eastern Bosnia, Sandjak of Novipazar, Kosovo and Metohia, and Macedonia (from *Antiquarian Researches*).

negro enabled Evans to deduce the line of this road more inland than had been thought hitherto, across the *terra incognita* between Naronia in the Neretva valley and Scodra in Albania. The movement of armies in 1877 and 1878, the traditions of Serbian royal refugees in the Middle Ages, and the enduring mule tracks worn in the mountains, all combined to a solution, which the labours of Dimitri Sergejevski have since for the most part confirmed.⁵⁰ In eastern Bosnia the road which ran eastwards from the area of Sarajevo (Fig. 5) was followed along the line of the later road through the discovery of milestones between Pljevlja, Prijepolje and Novi Pazar.⁵¹ Further south the line of the road from Lissus inland along the Drin valley has still not yet been proved, although the major Roman settlements discovered in the plains of Metohia and Kossovo still tend to support the more northerly line which Evans suggested.⁵²

Away from the already well-known coastal sites Evans was responsible for the identification of some major Roman cities, hitherto only suspected through a number of inscriptions reported to European consuls at Sarajevo.⁵³ They include a major site at Blazuj, near the great spa at Ilidža close to the source of the Bosna, where extensive Roman buildings were uncovered during construction of the Austrian spa buildings in the 1890's.⁵⁴ Beyond the river Drina the distinctive Illyrian and Roman settlements at Pljevlja were first identified and planned by Evans (Fig. 6) and, apart from studies of the inscriptions by Patsch and Vulić, and the excavation of cemeteries a few years ago by Aleksandra Cermanović-Kuzmanović, the site has not been explored since.⁵⁵ Across the Roman border in Dardania, Evans was also responsible for identifying an important Roman city *municipium D.D.* at Sočanica in the Ibar valley, although he was prevented from examining the site, which lay in a sensitive area, by the Ottoman authorities. Its importance has since been demonstrated by the excavations of the late Emil Čerškov.⁵⁶ The most detailed study of an ancient site was that of Scupi (now Skopje, formerly Ūskub) in Macedonia (Fig. 7). The work was completed during a journey to Greece and Macedonia in 1883, which is described in the journal kept by Margaret Evans, now in the library of the School of Slavonic and East European Studies. Evans' work remains the fundamental study, with the site of the ancient city located at Zlokučani, not far west of modern Skopje, where the city was moved following the disastrous earthquake of AD 518. Since Evans wrote, some houses have been excavated by Ćiro Truhelka and the theatre was partly uncovered by Nikola Vulić, both before the Second World War.⁵⁷

Mixed in with the topographical sections are digressions on historical and linguistic topics. From the evidence of place-names, craniological measurements from skeletons in medieval cemeteries, and the Ragusa archives, he pointed out the likely survival of the sub-Roman Vlach or Mavro-Vlach peoples in the hinterland of Epidaurum, in eastern Bosnia between the Drina valley and Pljevlja, and among the hills of Dardania where they are recorded by Venetian travellers east of Prijepolje.⁵⁸ The great variety of ancient Illyrian names on Roman tombstones and the remarkable survivals of their dress styles and other arts among the peasantry are frequently cited.⁵⁹ Although Evans certainly made errors, for example in some of his readings and restorations of difficult epigraphic texts (yet at the same time he was often more cautious and reliable than some more



Fig. 6 Plevlje and area (from *Antiquarian Researches*).



renowned scholars), it is true to say that our present picture of those lands in the Roman and early medieval eras, while obviously more detailed, has not departed significantly from the lines sketched out in *Antiquarian Researches*.

The later story of Evans' life, as Keeper of the Ashmolean Museum and then world famous excavator of Cnossus in Crete, is familiar to all, but a few details from the years following his expulsion from Ragusa in 1882 may be relevant to his Illyrian work. Back at Oxford he busied himself with preparing the notes for his papers in *Archaeologia*. He dismissed a suggestion from his father-in-law that he might apply for a new chair of Classical Archaeology at Oxford. Observing that the influence of Benjamin Jowett was so dominant, he replied that 'Europe, except the Europe of a favoured period and a very limited area (for I take it that neither Gaul, Britain or Illyricum were ever classical in Jowett's sense) is to be rigorously excluded!'⁶⁰ In 1884 he delivered at Oxford four of his six Ilchester lectures on the Slavonic conquest of Illyricum, which remained unpublished. While he contributed occasional articles on Balkan topics to the *Manchester Guardian* and *The Times*, he was now an outsider, although when travelling abroad he was still considered to be as dangerous as explosive by the Foreign Office, who were at first unwilling to grant a visa for travel to the Crimea in 1886.⁶¹ From time to time he hoped for a reporting commission in Serbia or Macedonia, and in 1890 interviewed some leading Balkan statesmen for the *Manchester Guardian*, returning incognito through the still forbidden Austria. On 16 March 1892 his father-in-law Freeman died, and Evans completed the fourth volume of his history of Sicily. In the following year Margaret Evans died.

Always fascinated by gems and similar minute objects, his increasing interest in the prehistory of the eastern Mediterranean was concentrated on some engraved seals from Crete. In March 1894, at the age of 43, he landed at Candia on the island which was still a province of the Turks, but in which he soon found a land and people to replace his beloved Ragusa and its Illyrian ancestors.

In the 100 years that have passed since Arthur Evans and his brother crossed Bosnia and the Hercegovina, few have managed to equal his original contribution to the ancient history and archaeology of those lands. This is not to disparage the work of Austrian scholars who worked out of the Landesmuseum at Sarajevo, Hoernes, Patsch, Truhelka, Radimsky, Ballif, or their Yugoslav successors Dimitri Sergejevski, and Nikola Vulić, who perished cruelly in the brutality of the Second World War, and their more recent successors (among whom I must perhaps include myself). Yet all too frequently the proper scope of their work was, and alas still is, limited by administrative and political boundaries. It is fair to conclude that while they have added to the work of Evans, and pointed out the inevitable errors of a pioneer, the sum of their achievement is no more than a very slow, and in many ways disappointing, elaboration of Evans' results.

It is a tradition of occasions such as this to acknowledge the achievements of predecessors. Our first Romanist and first director will, I am sure, allow me to embezzle what is his due by recalling the story of how in 1913 he was awarded the A. W. Franks archaeological studentship established in 1910 jointly by our University and the Society

of Antiquaries to study his chosen topic of Romano-Rhenish pottery. The sum of £50 which it brought was not enough to live on, and was doubled by Arthur Evans, who thus contributed at a crucial stage to the creation of this Institute.⁶²

I should like, however, to conclude by recalling the name of Donald Emrys Strong. It is not necessary for me to remind this audience of what is so well known – that he commanded the highest respect from all who knew him, both as a scholar and as a man, and books by him yet to appear will reinforce this. For myself I can hope that he would have found some interest and diversion in what has been said here.

The following abbreviations are employed in the notes:

AEM	<i>Archaeologisch-epigraphische Mitteilungen aus Oesterreich-Ungarn</i> , Vienna
CIL	<i>Corpus Inscriptionum Latinarum</i> , Berlin
GZMS	<i>Glasnik Zemalskog muzeja u Sarajevu</i> , Sarajevo
JOAI	<i>Jahreshefte des Oesterreichischen Archaeologischen Instituts</i> , Vienna
JRS	<i>Journal of Roman Studies</i> , London
PBA	<i>Proceedings of the British Academy</i> , Oxford
PSAL	<i>Proceedings of the Society of Antiquaries of London</i> , London
NC	<i>Numismatic Chronicle, and Journal of the Numismatic Society</i> , London
RE	<i>Realencyclopädie der classischen Altertumswissenschaft</i> , ed. Pauly, Wissowa, etc., Stuttgart
VAHD	<i>Vjesnik za Arheologiju i Historiju Dalmatinsku</i> , Split
WMBH	<i>Wissenschaftliche Mitteilungen aus Bosnien und der Herzegovina</i> , Vienna

- (1) *PSAL* 2nd series, vol. IX, 1881–3, pp. 175–9.
- (2) 'On some recent discovery of Illyrian coins', *NC*, new series, vol. XX, 1880, 269–302.
- (3) 'Antiquarian Researches in Illyricum: I Epitaurum, Canali, and Risinium (read 30 Nov., 1882)' and 'II Notes on the Roman road-lines – Siscia, Salonae, Epitaurum, Scodra (read 7 Dec., 1882)', *Archaeologia* XLVIII, 1884, 3–52, 54–105.
- (4) 'Antiquarian Researches in Illyricum: III Notes on the Roman road-line from Salonae to Scupi, and on the municipal sites and mining centres in the old Dalmatian and Dardanian ranges (read 8 March 1883)', and 'IV Scupi, Skopia, and the birthplace of Justinian, with notes on the Roman road-line Scupi–Naissus–Remesia (read March 1884)', *Archaeologia* XLIX, 1885, 5–78, 82–167.
- (5) *PSAL* 2nd series, vol. IX, 1881–3, 176.
- (6) *Time and Chance, The Story of Arthur Evans and his Forebears*, by Joan Evans, Longmans Green and Co., London 1943. This splendid work, written under difficult wartime conditions, is the chief source for details about Evans' private life and is essential for understanding the background to his political and archaeological activities.
- (7) The title of Evans' first published work (outside Harrow), an account of his Transylvanian journey in 1872 published in *Frazer's Magazine* VII, May 1873, 578.
- (8) For a recent treatment of the role of the 'Illyricians' see Andras Mócsy, *Pannonia and Upper Moesia*, London 1974, 200–12.
- (9) For the course of these and similar uprisings and their impact on British political life see R. W. Seton-Watson, *Disraeli, Gladstone and the Eastern Question, a Study in Diplomacy and Party Politics*, London 1935. For a somewhat more favourable view of British policy during the Eastern Crisis see Robert Blake, *Disraeli*, London 1966, 570ff. The most recent treatment of the agitation, in its early stages, is R. T. Shannon, *Gladstone and the Bulgarian Agitation 1876*, London 1963 (republished 1975), esp. 35ff.
- (10) Late in 1875 he published some of his sketches accompanied by short articles in the *Graphic*.
- (11) William Longman's brother was a partner in Dickinson's and was willing to publish at the expense of the author. John Evans produced the subsidy of £100. Gladstone wrote an appreciative note acknowledging his presentation copy, *Time and Chance*, pp. 182–3.
- (12) Evans' description of Bosnian conditions was used by Gladstone for his speech to the National Convention on the Eastern Question in St James' Hall on 8 and 9 December 1876, which marked his emergence from retirement. See Seton-Watson, pp. 110–5.
- (13) pp. 82–3.
- (14) pp. 308–9.

- (15) *Introduction*, pp. lxii–lxiii.
- (16) *Time and Chance*, p. 190.
- (17) Together with Miss Muir-Mackenzie she had written a remarkable travel book, *Travels through the Slavonic Provinces of Turkey in Europe*, London 1866, to which Gladstone contributed a foreword. By 1865 she had settled in Sarajevo.
- (18) He reviewed the writings of others on the area in the *Academy* and the *Pall Mall Gazette*.
- (19) The episode is described by Seton-Watson, pp. 213–6, 'Consul Holmes and Arthur Evans'.
- (20) Seton-Watson, pp. 451–4.
- (21) Described in a report (dated 17 April) to the *Manchester Guardian*, 27 April 1877.
- (22) I should like to acknowledge generous help from the School librarian Mr Screen and his colleagues, and also the help of Professor V. Ménage of the School of Oriental and African Studies, in the matter of this remarkable document.
- (23) *Time and Chance*, p. 164.
- (24) On 24 May 1877, *Time and Chance*, p. 194.
- (25) *Time and Chance*, p. 199.
- (26) Evans was not actually present at the siege and capture of Nikšić on 8 September but visited the town a few days later, when the drawing and the plan he published in *Archaeologia* XLVIII, pp. 86–7, were made. He wrote a detailed account of the condition of the town after the siege on 21 and 23 September published in the *Manchester Guardian* on 3 and 5 October 1877.
- (27) *Illyrian Letters, a revised selection of correspondence from the Illyrian provinces of Bosnia, Herzegovina, Montenegro, Albania, Dalmatia, Croatia, and Slavonia, addressed to the 'Manchester Guardian' during the year 1877*, by Arthur J. Evans, B.A., F.S.A., London: Longmans Green and Co., 1878.
- (28) *Illyrian Letters*, pp. ix–x.
- (29) He caused particular offence by his violent attacks on the prime minister Disraeli in his speeches to public meetings, matching the fanatical loathing of Gladstone among some English Turko-phils. See Seton-Watson, op. cit., pp. 112–4.
- (30) Evans' growing suspicion of Austrian policies towards the people of Bosnia is evident in his reports describing the advance of Austrian troops into the area, published in the *Manchester Guardian* on 1, 6, 7, 10, 12, 16, 17 August 1878.
- (31) 'The new crisis in Bosnia', in the *Manchester Guardian*, 2 April 1879.
- (32) '...a doctor in the army resplendent with medals, and also secretary of the Anthropological Society at Vienna', *Time and Chance*, 224f.
- (33) The difficulties of independent reporting from the new Austrian territories are described with some passion in Evans' article 'The Austrian War against Publicity' in the *Contemporary Review*, vol. XLII, September 1882, 383–99.
- (34) Evans was much distressed by the unwillingness of Gladstone to insist that Austria should be made accountable as a trustee for the Great Powers in her occupation of the Turkish provinces following the Congress of Berlin. His views were brought to the prime minister's notice by Freeman and Bryce. In a letter to Bryce on 31 May 1880 Gladstone observed that 'his letter does not cause me any qualms of conscience' and added 'What Austria's conduct in Bosnia and Herzegovina may be I have no adequate opportunities of knowing; but her position there was confirmed by the united authority of Europe, and no one had under the circumstances anything better to suggest.' See *Time and Chance*, pp. 229–30. During the election campaign of 1880 Gladstone, sensitive to the deep popular dislike of Austria in Britain, had made such outspoken statements as: 'There is not an instance – there is not a spot upon the whole map where you can lay your finger and say: "There Austria did good."' After he returned to power at the election he volunteered an assurance to the affronted Austrian diplomat Count Karolyi that he would willingly withdraw if he understood that he had misapprehended the circumstances. When the ambassador replied that Austria intended to observe strictly the Treaty of Berlin, Gladstone replied in his turn that he regretted the words of 'a painful and wounding character'. At the time, he explained, he was 'in a position of greater freedom and less responsibility'. Some of this correspondence between the prime minister and the Austrian ambassador was published on 11 May 1880, only a few days after his victory at the polls had been confirmed.
- (35) Illustrated in *Time and Chance*, p. 231 (from which the version published here is reproduced).
- (36) From May 1880 onwards Evans wrote many reports to the *Manchester Guardian* on the Albanian Question, where members of the Albanian League feared that they were being forgotten when the claims of Montenegro were being pressed by some of the European powers. Evans drove himself to illness and exhaustion through constant travelling and reporting. At the time he was the only one who could report the local background to a growing crisis, which, however, slightly dissolved with the onset of winter.

- (37) The story of the imprisonment and attempts to secure Evans' release is told in *Time and Chance*, pp. 239–58. A brief account of the affair is included in Evans' article mentioned in note 33 above.
- (38) See Mommsen, *CIL* III, p. 271. On his travels in general see Bernard Ashmole, *PBA* XLV, 1959, 25–41.
- (39) *CIL* III, p. 287: 'Quam ob rem aut valde fallor aut ita conciliandae sunt auctoritates sibi contrariae, ut primum coloniam Epidaurum considerint Romani ad Prevlakam, sed eam deinde non cadente demum imperio, sed vigente et florente ob causas nescio quas transtulerint ad Ragusam veterem fuerintque itaque eiusdem nominis oppida duo, Epidaurum vetus, unde non habemus nisi unum titulum n. 1738 et Epidaurum id, cuius iam sequuntur tituli.'
- (40) *Archaeologia* XLVIII, 1884, 4–29. The magistrate's epitaph was published as *CIL* p. 1493, no. 8407: ... A/quilio/Tr/om(entina) Aqui/[lin]o aedili / [Ilv]iro iure / [d]icundo / [Il]viro qui/[n]quennali ... On the subject of Prevlaka Evans writes (p. 5): 'A careful examination of the isthmus and peninsula of Prevlaka has convinced me that no town ever existed at that spot.' On Epidaurum in general see J. J. Wilkes, *Dalmatia*, London 1969, 252–4, to which should be added G. Novak, *Rad Jug. Akad. znanosti i umjetnosti* 339, 1965, 97–121, and *Corolla memoriae E. Swoboda* (Röm. Forsch. in Niederösterreich. V), Graz, 1966, 169–72.
- (41) *Archaeologia* XLVIII, 1884, 37, fig. 12. Walled into the porch of St John's Church (Sveti Ivan) in the village of Ljuta near Gruda in Konavle. Republished by Frankfurter in *AEM* VIII, 1884, p. 251, no. 309 from a copy by Schneider, from which was taken the version of *CIL* III 8408. Evans' version appeared in *Slovinac* 1883, p. 394. The aerial photograph of the Epidaurum centuriation was published by M. Suić, *Zbornik Instituta za historijske nauke u Zadru*, I, 1955, plate VIII.
- (42) On Risinium see now Alföldy, *RE* Suppl.-Bd. XI, 1968, 1214–7. Evans, op. cit., 46, refers to 'the foundations of houses, including a mosaic pavement, to be seen about half an hour up the mountainous steep on the East and near a delicious fountain.' It is not clear if these are the same as the mosaics now visible at Risan. These latter were uncovered in August 1930 and carefully published, with photographs and drawings, by Douchan Vouksan (director of the Cetinje museum), 'Les mosaïques romaines de Risan (Risano),' in *Albania* (Paris), no. 4, 1932, 77–86. From the plan they seem to lie much closer to the shore than the place indicated by Evans.
- (43) Evans, op. cit., 54. 'An account of some ancient Roman Inscriptions, lately discovered in the provinces of Istria and Dalmatia, with Remarks. In a letter to the Rev. Dr Milles, Dean of Exeter, and President of the Society of Antiquaries, from John Strange, Esq.', *Archaeologia* III, 1775, 337–49; cf. v, 1779, 169–81. The drawing of the surviving arches from the Burnum *principia* is taken from the Abbé Fortis' *Viaggio in Dalmazia*, 1774, p. 119, fig. V (at a scale of approx. 1:300). On the legionary fortress in general see C. Patsch, *RE* III, 1897, 1068–70, and for a brief account of the Austrian excavations, E. Reisch, *JOAI* XVI, 1913, Beiblatt 113ff.
- (44) Evans, op. cit., 68–72. Mommsen had located Delminium at Gardun mainly on the evidence of *CIL* III 3202, cf. p. 358, also Patsch, *RE* IV, 1901, 2457–9. The identity of the legionary fortress of leg. VII is now clearly established as Tilurium, see Alföldy, *RE* Suppl.-Bd. XI, 1968, 1260–8 (with earlier literature), while the native settlement of Delminium is to be sought at some place in the Duvjansko polje, see M. Zaninović, *VAHD* LXIII–LXIV (1961–2), 1969, 49–56 (locating it at the Gradina kod Gaja, above the modern town of Duvno), where has now been discovered a conclusive record of a *dec(urio) municipii Delminensium* etc., at Prisoje near Duvno, I. Bojanovski, *GZMS* XXV, 1970, 7, fig. 1.
- (45) On the colony in general see Wilkes, *Dalmatia*, pp. 245–52, and plate 25 for the situation. For the records of *m(agistri) M(ercuriales)*, p. 250, note 2. The statement about the absence of evidence for centuriation at Narona needs now to be revised following the identification of such a system near Ston, north of Dubrovnik, M. Zaninović, *Adriatica Praehistorica et Antiqua* (*Miscellanea Gregorio Novak dicata*), Zagreb, 1970, 489–502, which must surely lie within the Narona territorium.
- (46) Evans, op. cit., 55, footnote b. For subsequent investigations of roads in that region see C. Patsch, *Die Lika in römischer Zeit* (*Schriften der Balkankommission, Antiquar. Abt.* 1), Vienna 1900.
- (47) An incident described by an indignant Evans in *Illyrian Letters*, pp. 58–61, cf. *Time and Chance*, p. 191.
- (48) Evans, *Archaeologia* XLVIII, 1884, 94–105. The Claudian milestone, p. 101, fig. 15a, from Lučin Do (Lučki Do), was published as *CIL* III 10175. He also discovered and copied, p. 96, fig. 11a, a 4th century milestone, *CIL* III 10176. When Dimitri Sergejevski re-examined the line of the road between Epidaurum and Trebinje in 1936 and 1961, neither could be located and he could only reproduce Evans' original drawings for his own study of the road in *GZMS* XVII, 1962, 75–8.

- (49) N. G. L. Hammond, *A History of Macedonia, 1 Historical Geography and Prehistory*, Oxford 1972, 19–33 cf. *JRS* LXIV, 1974, 185–94.
- (50) Evans, *Archaeologia* XLVIII, 1884, 80–105. The line of the road through Montenegro was traced between Scodra and Nikšić by C. Praschniker and A. Schober, *Archaeologische Forschungen in Albanien und Montenegro (Schriften der Balkankommission, Antiquar. Abt. VIII)*, Vienna 1919, 95–101, and further north in Montenegro, between Nikšić and Trebinje by D. Sergejevski, *GZMS* XVII, 1962, 78–92. Here the road followed a line more to the south than that suggested by Evans across the difficult country between the plain of Nikšić and the upper valley of the Trebišnjica north of Trebinje; see maps of Sergejevski, nos. III and IV.
- (51) *Archaeologia* XLIX, 1885, 23–78. For more recent work on the line of the road between Sarajevo and the river Drina see E. Pašalić, *Antička Naselja i Komunikacije u Bosni i Hercegovini*, Sarajevo 1960, 69–70. East of the Drina and beyond Pljevlja little work has been done since Evans. His milestone at Čičjapolje between Pljevlja and Prijeplje in the Lim valley, p. 43, fig. 20, was published as *CIL* III 10163, and for the line of the road east of Prijeplje towards Novi Pazar, there is the milestone with text wholly obliterated at Mileševac, p. 46, which was not registered among the milestones of Moesia Superior in *CIL* III, pp. 1469–70.
- (52) Evans, *Archaeologia*, XLIX, 1885, 66–72. An earlier view, originating from Const. Jireček, that the road between Lissus and Metohia followed a line south of the river Drin, has generally been preferred by the standard works, e.g. Kiepert, *Forma Orbis Antiqua* XVI, K. Miller, *Itineraria Romana*, Stuttgart 1916, 556, although there is much truth yet in Evans' remark that 'hitherto the course of the Roman Way from Lipljan to Alessio (= Lissus), and the site of the Roman settlements in the intervening region, have not far advanced beyond the stage of pure conjecture.' For what is known of Roman roads and settlements in Kossovo and Metohia see E. Cerškov, *Glasnik Muzeja Kosova i Metohije*, II, 1957, 65–82.
- (53) Some years previously the Prussian consul at Sarajevo Dr Otto Blau had been asked by Mommsen to visit Pljevlja and record what he could of the inscriptions. His account appeared in the *Monatsbericht* of the Prussian Academy for 1866, p. 838ff., and the texts he obtained were included in the addenda to the first part of *CIL* III, p. 1028, nos. 6339–57. The Austrian consul Herr Müller was also active, Evans, op. cit., 26.
- (54) Evans, op. cit., 16–19. The excavations of 1893 were described by J. Kellner in *WMBH* V, 1897, 131–62, and those from 1955 to 1958 by E. Pašalić, *GZMS* XIV, 1959, 113–36 cf. Wilkes, *Dalmatia*, pp. 382–3, for a brief resumé.
- (55) Evans, *Archaeologia* XLIX, 1885, 25–43, published not long after an account of the site by the Austrian archaeologist M. Hoernes, *AEM* IV, 1880, 184–98. Later studies, dealing with the inscriptions rather than the topography of the site, were published by C. Patsch, *WMBH* IV, 1896, 276–92; VIII, 1902, 115–21; XII, 1912, 102–31, and by N. Vulić, *Spomenik Srpska Akad. Nauk.* XCVIII, 1941–8, 129–45. Remarkable discoveries in the Roman cemeteries at Pljevlja, including native Illyrian tombstones still *in situ*, have been reported by Aleksandra Cermanović-Kuzmanović, *Materijali IV (VII Kongres Arheologa Jugoslavije, Herceg-Novi 1966)*, Belgrade 1967, 77–84; *Starinar* XVIII (1967), 1968, 201–6; XIX (1968), 1969, 108–9; *Hommage à Marcel Renard* III, Brussels 1969, 116–23; *Receuil de travaux de la Faculté de Philosophie (Zbornik Radovi, etc.)* XI, 1970, 75–81; *Starinar* XX (1969), 1970, 25–8.
- (56) Evans, op. cit. 56, fig. 27, furnishes a drawing of the sarcophagus of *M. Aurelius Felicianus dec(urio) mun(icipii) DD* from Sočanica, published as *CIL* III 8297, where the name of the city has been interpreted as *municipium Dardanorum* or *Dardanicum* and connected with the *metalla Dardanica*, a legend which appears for the first time on coins of Trajan, cf. Mócsy, *Pannonia and Upper Moesia* 133 and 223. For the remains of the substantial buildings now uncovered on the site of the city at Sočanica see E. Cerškov, *Municipium DD, Sočanica, Plišina-Belgrade 1970*.
- (57) See above note 4. The two volumes of Margaret Evans' are titled *Journal of Greek and Macedonian Travel*, 1883. For published work on Scupi since Evans see the literature cited by A. Mócsy, *Gesellschaft und Romanisation in der römischen Provinz Moesia Superior*, Amsterdam 1970, 62. For the excavation of houses see C. Truhelka, *Glasnik Skopskog Naučnoj Društva* V/2 1929, 78ff., and for the theatre N. Vulić, *Nekoliko pitanja iz Antičke Istorije naše zemlje i rimske starine (Some questions connected with the ancient history of our country and Roman Antiquities)*, Belgrade 1961, 3–23 (Serbian) and 87–91 (English) and plates 1–56. The most recent plan of Scupi is that published by S. Josifović, *Zbornik, Receuil des Travaux, Publication du Musée Archéologique*, Skopje I, 1958, 81.
- (58) Evans, *Archaeologia* XLVIII, 1884, 31–6 (in Konavle near Epidaurum), XLIX, 1885, 24 (between the Drina and Pljevlja) and 46–8 (the *Montagna di Morlacco* between Pljevlja and Novipazar). See also Const. Jireček, *Die Romanen in den Städten Dalmatiens während Mittelalters (Denkschriften Akad. Wien, XLVIII/3, XLIX/1–2, 1901–4)*.

- (59) Notably in his comments on the Pljevlja tombstones, *Archaeologia* XLIX, 1885, 33–40. For a well illustrated survey of native tombstone sculpture see D. Sergejevski, *Godišnjak* III (Centar za Balkanološka Ispitivanja, kn. 1), Sarajevo 1965, 119–42.
- (60) *Time and Chance*, p. 261.
- (61) *Time and Chance*, p. 277. It was necessary for James Bryce to be guarantor for Evans' non-political intentions before a visa was granted.
- (62) For the creation of this studentship see Joan Evans, *A History of the Society of Antiquaries*, Oxford 1956, 358 and also 397 where it is recorded that in 1926 the University reported to the Society that it was becoming extremely difficult to find suitable candidates, and it was finally allowed to lapse in 1929. The anecdote of Evans and the £50 appears in Mortimer Wheeler's *Still Digging*, London 1955, 34.

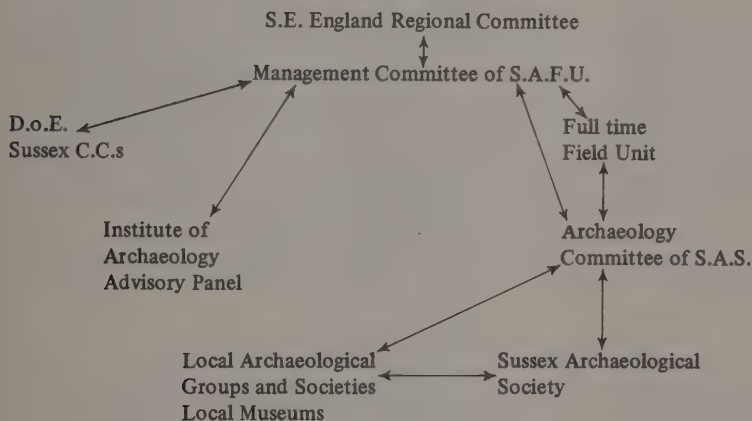
Rescue Archaeology in Sussex, 1975

By

Owen Bedwin, Martin Bell, Peter Drewett, David Freke, John Gibson-Hill, Martin Millett, Terry O'Connor, Michael Pitts, Mark Redknap and David Williams

Interim Reports compiled by Peter Drewett, Field Director

The proposals for the organisation of Rescue Archaeology in Sussex outlined in 1974 (Drewett, 1974: 3) have been modified somewhat over the first two years of the life of the Sussex Archaeological Field Unit. The present structure may be outlined as follows:



The Management Committee of the Unit consists of six members who act as representatives of the principal organisations involved in Sussex archaeology. The present membership is as follows: Professor J. D. Evans (Chairman), Dr G. J. Wainwright (Department of the Environment), Mr E. Holden (Sussex Archaeological Society), Mr A. Down (Chichester Excavations Committee), Mr F. Aldsworth (West Sussex County Council) and the Field Director of the Sussex Archaeological Field Unit. This committee supervises the general policies of the Unit while the running of the Unit comes under the supervision

of the Field Director. At present he has two full-time Field Officers (Owen Bedwin and David Freke), a Research Assistant (Caroline Cartwright) and an illustrator. The field projects were undertaken by the full-time officers and by students together with local archaeologists under the supervision of the Unit.

The full-time Unit staff have been undertaking two broad surveys during 1975. Mr P. L. Drewett has been examining plough damage inflicted on all known archaeological sites in the county, while Mr D. J. Freke, in co-operation with Mr F. Aldsworth, has been undertaking an urban survey. Future work in Sussex will be largely determined by the results of these surveys.

The selection of sites for excavation during 1975 (Fig. 1) was the result of several factors. Firstly, the major sites of Bishopstone and Broadfields, Crawley, were completed. Both Mr Bell and Mr Gibson-Hill will now be employed by the Unit for one year to prepare the reports on these sites which were being funded by the Department of the Environment prior to the formation of the Unit. The remaining excavations either continued projects begun in 1974 (Alfriston, Lewes, West Heath and Ardingly) or were trial excavations on threatened sites (North Bersted, Elsted and Hastings) or, as in the case of Saxonbury, on a major road development. The sites were again selected on both a period basis and geographically.

Now that the Unit is firmly established in Sussex, and some of the major archaeological problems understood, the continuation of the relatively random selection of sites simply on the grounds that they are about to be destroyed is no longer considered valid, given the limited manpower and finance available. It is therefore proposed to set up four research projects to operate over the next five years in Sussex, within a rescue framework. These projects will involve both intensive field survey and the excavation of selected threatened sites. The establishment of these projects will not exclude the excavation of sites outside the projects where a special case can be made for their importance. The projects proposed are: (1) Neolithic and Bronze Age Settlements and their Territories; (2) Pre-Roman Iron Age Settlement in relation to Environment and Economy; (3) A Multiperiod Settlement project based on Bullock Down; (4) The Origins of Towns Project.

I. The Excavation of Barrow IV at West Heath Common, West Sussex 1975

by P. L. DREWETT

Barrow IV at West Heath Common was excavated prior to its destruction by sand quarrying (Drewett, 1975a). It formed the centre for the Institute's Easter Field Course from 22 March to 20 April 1975.

The barrow (Plate I) consisted of a turf mound 14 m. in diameter surviving to a maximum of 1 m. in height. This was surrounded by a berm varying from 2.5 to 5 m in width, separating the mound from a substantial ditch (Fig. 2). The upcast from the ditch had been piled on and around the turf mound. The mound had been very badly disturbed

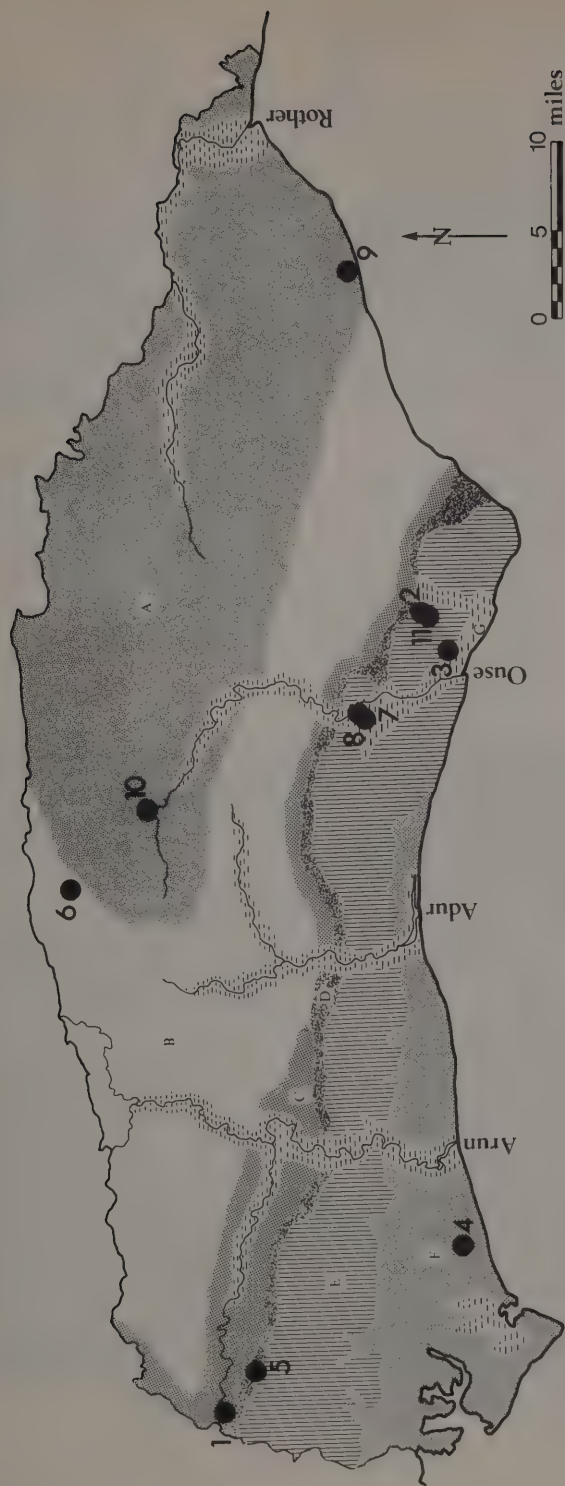


Fig. 1 Projects undertaken by the Sussex Archaeological Field Unit, 1975.

1. West Heath
2. Alfriston
3. Bishopstone
4. North Bersted
5. Elsted
6. Crawley
7. Saxonbury
8. Lewes
9. Hastings
10. Ardingly
11. Alfriston Survey

Geological base map: A: Wealden Sands and gravel; B: Wealden Clay; C: Greensand; D: Gault Clay; E: Chalk; F: Sand and gravel; G: Alluvium.

by rabbits and tree roots and a large machine-dug hole had been cut to the north of the centre.

The only feature buried by the turf stack was a patch of charcoal and fire-cracked flints found to the south-west of the centre of the mound. This may be interpreted as a small hearth (Fig. 2). The charcoal, identified by Miss C. R. Cartwright, consisted mainly of ivy (*Hedera helix*), ash (*Fraxinus* sp.) and birch (*Betula* sp.) with a few fragments of oak (*Quercus* sp.) and pine (*Pinus* sp.). All the charcoal was submitted to Harwell for a Carbon 14 determination.

The old land surface protected by the mound was well preserved although badly disturbed by rabbits around the edge of the mound. Charcoal from the old land surface

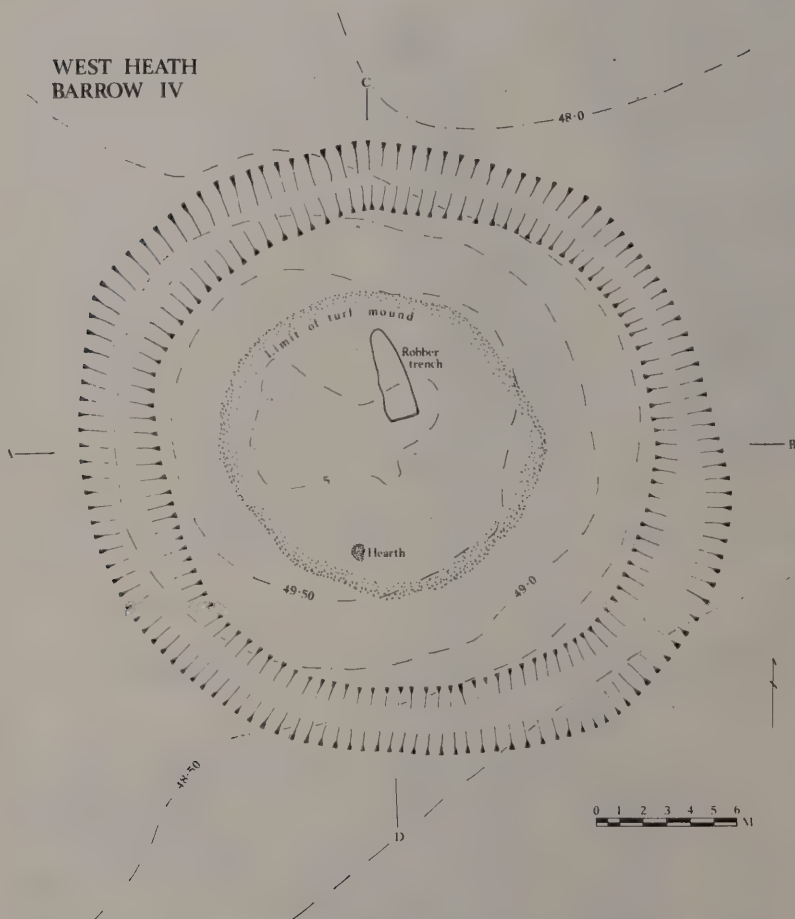


Fig. 2 West Heath 1975. Barrow IV. Contours at 0.5 m. intervals.

consisted of birch (*Betula* sp.), ivy (*Hedera helix*) and possibly a few fragments of oak (*Quercus* sp.). This charcoal was also submitted to Harwell for a Carbon 14 determination.

The turf stack consisted of irregular turves stacked both inverted and the right way up. Individual turves were subjected to on-site flotation, but only a little alder (*Alnus* sp.) and pine (*Pinus* sp.) charcoal was recovered.

The ditch surrounding the barrow was disproportionately large for the size of the mound. It was flat bottomed but was probably fairly steep-sided when originally dug (Plate II). The large numbers of rough flint nodules found in many areas of the ditch probably derive from irregular layers of residual flints in the top of the sand adjacent to the ditch.

A total of 394 worked flints were found during the excavation. The assemblage consists of rough flintwork with large, irregular cores, flakes and waste material. Although there appear to be some Mesolithic elements in this assemblage, the very rough and heavy nature of the flintwork indicates rather unspecialised flint-knapping, some perhaps related to the construction of the barrow.

Pollen analysis was undertaken by Mrs J. Baigent and samples of the old land surface were examined for mites by Mrs S. Denford.



Plate I West Heath 1975. Air view of Barrow IV from the north. (Photo: P. L. Drewett)



Plate II West Heath 1975. Barrow IV. Southern ditch section. Scale 2 m. (Photo: G. Denford)

II. The Excavation of a Round Barrow and Cross-Ridge Dyke at Alfriston, East Sussex

by T. P. O'CONNOR

The site lies about 1 mile west of the village of Alfriston, just above the 450 foot contour (TQ 508 038) and overlooks both the Weald and the Cuckmere Valley. The barrow lies approximately 150 m. west of the Alfriston Oval Barrow (Drewett, 1975b), and some 400 m. west of Long Burgh (Grinsell, 1934). To the west lies a long chain of round barrows extending over a mile to the top of Firle Beacon. Also to the west lie the Bronze Age settlements of Blackpatch ($\frac{3}{4}$ mile), and Itford Hill (4 miles) (Burstow and Holleyman, 1958). Proving or disproving an association between Blackpatch and either the barrow or the cross-ridge dyke was one of the purposes of the excavation. The local geology is Upper Chalk with a small Clay-with-Flints capping some 600 m. to the west of the site. The modern soil is a badly degraded plough Rendzina. It was hoped to obtain information about the prehistoric soil conditions and general ecology by molluscan analyses of any old land surface, or primary silting in the cross-ridge dyke.

The barrow was excavated using the quadrant method and three trenches were excavated across the cross-ridge dyke, so as to obtain ditch profiles on both the north and south facing slopes of the Downland crest.

The cross-ridge dyke (Feature 1). This feature traversed the crest of the Downs about 50 m. west of the round barrow, petering out in the head of a dry-valley to the south, and on the north facing scarp of the Downs (Fig. 19). Crop marks, and an unploughed stretch of dyke, revealed a low bank on the east side, with a narrow or non-existent berm. The ditch averaged about 2 m. wide at the top, and was roughly V-shaped with a narrow, flat bottom. The sides were well cut, and, with a neighbouring bank, would have served as a good barrier to the passage of animals. The ditch averaged about 1 m. in depth. Five layers were identified in the ditch (Fig. 3).

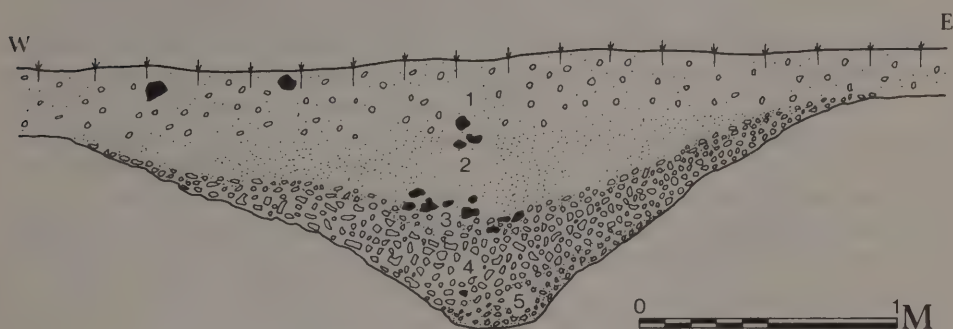


Fig. 3 Alfriston 1975. Section across Cross Ridge Dyke.

Layer 1. Modern ploughsoil; a thin, degraded Rendzina.

Layer 2. Well structured, stone-free pasture soil. A fairly humic Braunerde.

Layer 3. Fine chalk rubble in mid-brown silt, containing numerous sherds of Roman pottery. Roman ploughsoil.

Layer 4. Coarse chalk rubble in sparse, light brown silt. Secondary fill from collapse of ditch sides.

Layer 5. Fine chalk rubble. Primary silt of ditch.

The Barrow (Barrow 2 on Fig. 19). The barrow consisted of a low mound without a surrounding ditch (Fig. 4). Eight features were located during the excavation.

Feature 2: A small, postulated posthole in the south-west quadrant, near the barrow centre. This feature appeared, initially, to be merely a roughly circular irregularity in the surface of the chalk, but appeared in section to have a post pipe and packing.

Feature 3: A large solution hole extending 5 m. east from the centre of the barrow, and averaging 3 m. north-south.

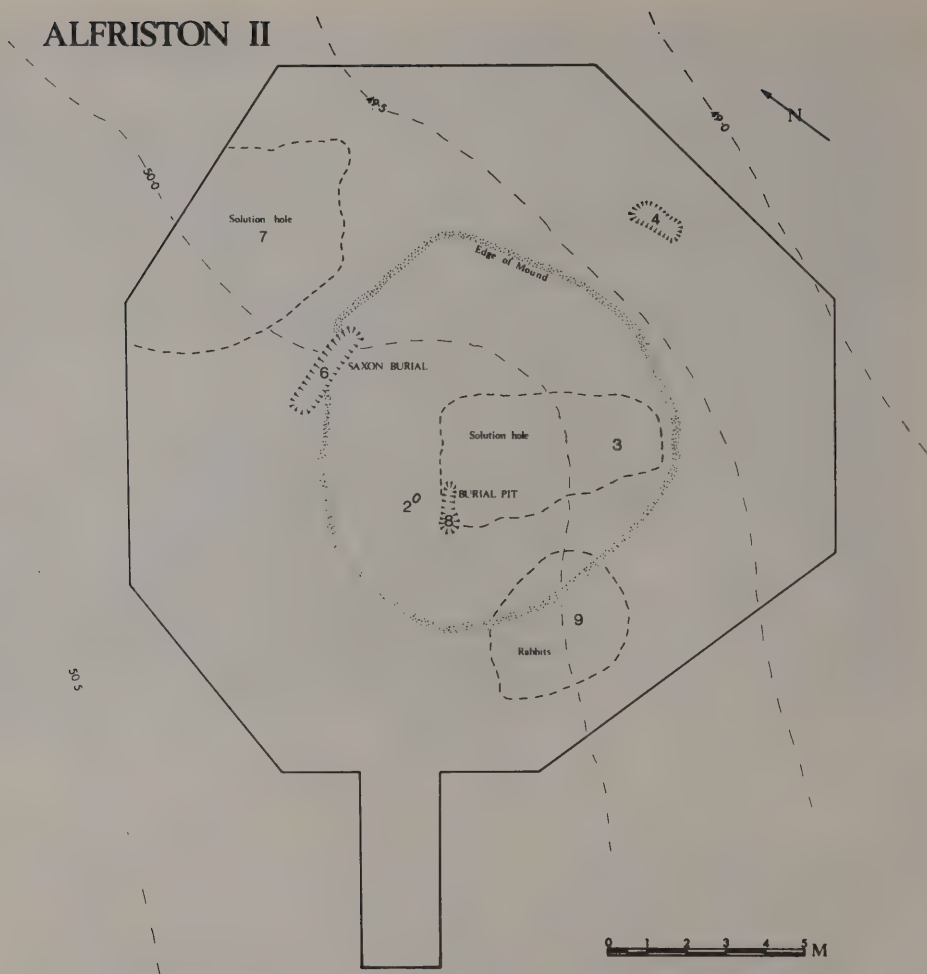


Fig. 4 Alfriston 1975. Barrow II. Contours at 0.5 m. intervals.

Feature 4: A rectilinear feature dug into the chalk on the north-east margin of the barrow. Being about $1.5 \times 0.5 \times 0.5$ m., this feature gave every semblance of being a small grave. The fill of the feature, a mixture of brown soil and chalk rubble, was clearly disturbed and contained recent rubbish. However, the floor of the feature was covered by a thin veneer of compact, chalky soil, and it appears to be of some antiquity, but subsequently robbed.

Feature 5: A small solution hole well off the north-east margin of the barrow.

Feature 6: A shallow inhumation. The body lay supine, with the head orientated west-north-west, and was that of a lightly built male aged about 40–45 years, and standing about 5' 9" in height. Health was apparently good, with the exception of the dentition. Interproximal caries was rampant throughout the anterior teeth, the molars all having been lost some years before death. The only grave good was a small iron knife found beneath the left forearm. The grave was flanked internally by two narrow ledges, and can almost certainly be dated to the Early Saxon period (Hogarth, 1973).

Feature 7: A large, irregular solution-hole off the north-west periphery of the barrow.

Feature 8: This feature comprised a circular primary interment cut by a later, rectilinear disturbance. The circular pit, to the south west end, was sealed by mound material. The disturbance cut through the mound, and was aligned roughly parallel to feature 6. The fill of loose brown soil with scattered flint nodules was continuous throughout. The later disturbance contained a group of human long bones, including one leg and two arms of a tall adult, probably male. The antiquity of these bones awaits a Carbon 14 determination from A.E.R.E., Harwell.

Feature 9: A large, irregular rabbit warren in the south-east quadrant. The feature contained loose brown soil and rabbit bones.

Layers 2 and 3 of the cross-ridge dyke yielded over 50 sherds of a fine, micaceous buff ware. A minimum of two vessels was represented, both being small ring-based flagons. The ware is apparently Oxfordshire ware, dating from the late 3rd to early 4th centuries AD. Above this marker horizon, layer 2 yielded sherds of a red-brown medieval ware. Below it, layer 4 yielded an assortment of prehistoric coarse wares. In particular, sherds of a coarsely gritted, thick ware, oxidised on the external face, were tentatively identified as of Middle/Late Bronze Age date by analogy with wares from Itford Hill (Burstow and Holleyman, 1958). Sherds of an identical ware were found in and beneath the barrow mound. Similar sherds were found in features 8 and 9. Sherds of an all-black ware with less coarse gritting were found in layer 2 and feature 8. A simple recurved rim from the former location strongly suggests a date in the Iron Age. A more problematical ware from layer 4 comprises several sherds of a thick, black ware, with relatively fine filler, with the outer surface coloured a deep red, to a depth of 2 mm. in places. There are signs that this colouring is a product of burnishing. This ware closely resembles 'Haematite ware' of earlier workers, and should most probably be ascribed a date early in the Iron Age.

The picture which emerges from the pottery, albeit tentative and subject to the constraints of any artefact typology, is one of a ditch dug either fairly late in the Bronze Age, or early in the Iron Age, being almost totally silted up by the later 3rd century AD. There ensued a phase of ploughing, perhaps only brief, followed by abandonment. The barrow seems also to have a rather late Bronze Age date, and some contemporaneity with the cross-ridge dyke and thence Itford Hill and Blackpatch, seems likely.

A total of 242 struck flakes were recovered, and two rough end-scrapers. Of the flakes, two showed nondescript retouch, three could be classed as blades, and one had the

appearance of a 'core rejuvenation flake'. The remaining 236 were waste flakes. The highest proportion came from the barrow mound. In the cross-ridge dyke, the majority of the flakes came from layers 2 and 4. The blades came one each from layers 3, 4 and 5. The tiny example from layer 4 is a particularly well-made specimen. The core rejuvenation flake is also from layer 4, and comes from a roughly cylindrical core which would have yielded similarly fine bladelets. The two retouched flakes appear to be off-cuts from the manufacture of a fairly substantial core tool. The shallow working over their dorsal surfaces is almost certainly soft-hammer, or even pressure working. The previous discovery of finished and unfinished Neolithic axes in the same area should be borne in mind (Drewett, 1975b). The end scrapers are steep-backed and of rather clumsy manufacture. One came from layer 1, and the other from layer 2.

The results of these excavations *imply* a chronological association between the cross-ridge dyke and the barrow. This is, however, on rather vague ceramic grounds. If the cross-ridge dyke is to be associated with the Black-patch settlement, then the barrow can be seen as lying just outside the area enclosed by the dyke, and thus, perhaps, on unclaimed territory. On a less hypothetical plane, the construction of the barrow is of interest. A heaped-up mound of soil, with no quarry ditch, is not a common form. The implications are clear. Given a little more erosion by ploughing and hillwash, the barrow would have disappeared without even leaving a ring ditch. Thus, perhaps, the folly of equating barrow distributions with ring ditch distributions, if this type of barrow is more plentiful than is currently admitted.

Acknowledgements

I would like to thank Mr J. Lewis of Berwick Court Farm for his permission to conduct this excavation and for his co-operation during the excavation. Thanks are also due to all those who helped in any capacity on the excavation.

III. Further excavations on Rookery Hill, Bishopstone, East Sussex

by M. G. BELL

This multi-period site is on a south facing spur of chalk downland which projects into low ground at the mouth of the River Ouse. In prehistory it would have been surrounded on three sides by water or marsh of the former Ouse estuary. On the sides of this spur are traces of lynchets and on its crest at 45 m. O.D. are a succession of settlements which have been under excavation since 1967. They are ideally situated to exploit the agricultural potential of a downland spur and the economic advantages offered by the proximity of the Ouse estuary and sea shore.

Previous seasons' excavations have shown the site was occupied from the mid first millennium to the 6th century AD (Bell, 1972). The Early Iron Age settlement consisted of numerous pits and postholes, several of which form squares of four posts. Subse-

quently, most of the site was enclosed by a ditch, outside which are traces of contemporary fields. The enclosure ditch had silted up by the Middle Iron Age, but occupation of the settlement continued into the Romano-British period when two enclosures were made. Within these were features dating from the 2nd to late 4th centuries AD. Probably in the first half of the 5th century an Anglo-Saxon settlement was established. On its western periphery was a contemporary cemetery excavated by D. Thomson in 1967–8 when it was discovered during the construction of a housing estate (Wilson, 1968: 161). In 1975 1/7 hectare (1/3 acre) was stripped mechanically between last season's excavation (Bell, 1975) and the housing estate. This is arable land with a soil of average thickness 30 cm. Ploughing cuts into archaeological features and will ultimately lead to their destruction.

Neolithic

Three pits have a fill of rather orange earth cemented by calcium carbonate and are apparently of this period (Fig. 5). The most informative of these was a neatly cut pit of diameter 2 m. and depth 0.85 m. Pottery included well made everted rimmed bowls, carinated vessels and one sherd with a lug. Decoration is confined to short, vertical parallel grooves along the carination and oblique grooves round the rim. Similar vessels were found in the causewayed camps of the Trundle (Curwen 1929, Plates VIII and IX) and Whitehawk (Curwen 1936, Fig. 1). Numerous flakes, cores and hammerstones are evidence of knapping in the vicinity. Among the artefacts are a chipped flint axe, end scrapers, neatly made serrated blades and two leaf-shaped arrowheads. Before there had been time for weathering to damage its neatly cut sides, the feature was $\frac{3}{4}$ filled. It was then occupied for a short time, a hearth was made and shallow scoops were made in the unconsolidated fill. All layers contained numerous marine mollusca, predominantly mussels as evidence of the strandloping aspects of these peoples' economy. Froth flotation recovered good samples of seeds and charcoal which await identification, as do a small sample of animal bones.

A shallow scoop feature near this pit pre-dated Iron Age features and contained a similar preponderance of mussel shells and a single scrap of indeterminate pottery. This is tentatively dated to the Neolithic. More certainly of this period is a pit 3.6 m. x 2.9 m. and maximum depth 0.77 m. It was cut in the form of several intersecting scoop hollows and is thus irregular in shape. After cutting the feature was left to weather, during which no artefacts were deposited and the site was presumably deserted. Then a fire was made in the weathered hollow, crushed chalk and carbon fragments represent an occupation surface of this period on which are a scatter of flint flakes. Subsequently the feature was backfilled with clean chalk rubble containing only a few flints and flecks of charcoal. Features with this dark fill cemented by calcium carbonate are thinly scattered over the whole area excavated at Bishopstone, but hitherto they had only produced flint flakes. It now appears probable that they are the remains of a Neolithic settlement of which only the deepest features have escaped erosion by solution and the plough. Neolithic flakes and artefacts are commonly found in later features.

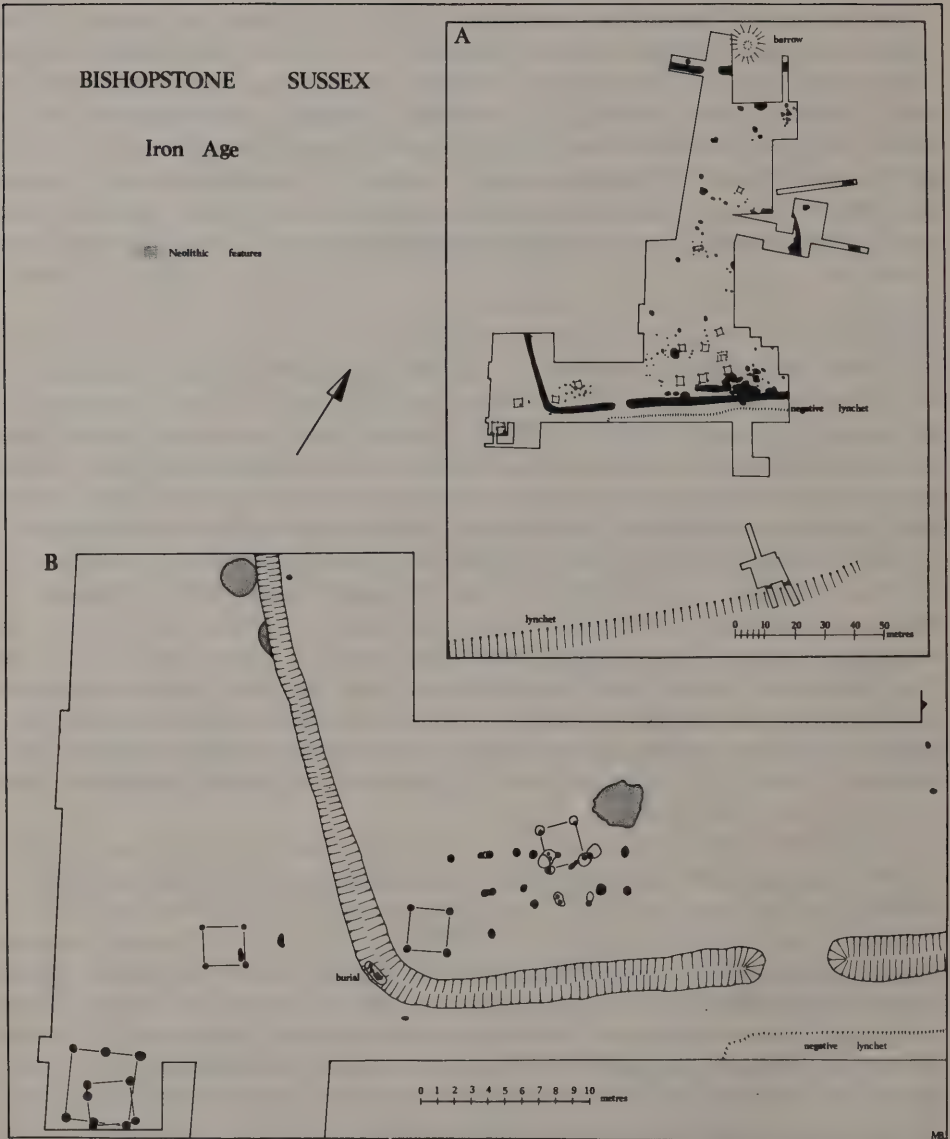


Fig. 5 Bishopstone 1975. Plan of Neolithic and pre-Roman Iron Age features.

Iron Age (Fig. 5)

A small farming settlement was established on the crest of Rookery Hill during the Late Bronze or Early Iron Age. Its primary, unenclosed phase is represented by three groups of postholes outside the later enclosure ditch. One was a large six poster, 4 m. square. Overlying it was a four poster 2.5 m. square and nearby was a second four poster of similar dimensions.

This year the south-west corner and southern entrance of the Early Iron Age enclosure were excavated, giving a better idea of its overall plan. It is more square and has more angular corners than previously envisaged (Bell, 1975, Fig. 9). Each side of the enclosure measures approximately 110 m. and the area enclosed is 1 hectare (2½ acres). The ditch was 1.3 m. wide on the west side and widened to 2 m. on the south side. The southern entrance was simply a causeway of width 3.7 m. and like the north entrance excavated in 1969, it had no associated postholes. In the ditch fill was abundant Early Iron Age pottery and fired clay objects, including triangular clay loomweights, spindle whorls and clay slingshot. Clay bricks and thick vessels may be associated with salt boiling. Cut into the ditch fill in the south-west corner was a grave containing the contracted burial of a young woman aged 16 to 19 years. With her were several bones of a baby under six months, whose fragile remains had been scattered in the grave by subsequent rodent activity. The woman's knees were flexed upwards in the grave and beside



Plate III Bishopstone 1975. Anglo-Saxon bow sided structure XXXVII with complex of Iron Age postholes in foreground. Scale 2 m. (Photo: B. Westley)



Plate IV Bishopstone 1975. Anglo-Saxon sunken hut structure XLVIII. Scale 2 m. (Photo: B. Westley)

them was part of an animal's long bone perforated by a hole, and half of a chalk spindle whorl; these may have been deliberately placed with the burial.

Iron Age features were nucleated in the south-west corner of the enclosure. Just inside the ditch was a four post structure 2.5 m. square and nearby a concentration of large postholes, many of which had multiple recuts. One recognisable structure was four large posts in a square of 2.3 m. This was postdated by a similar structure of slightly smaller posts. Other postholes had been recut on up to four occasions, and all produced abundant domestic debris. It is likely that this was the site of a domestic structure in the sheltered south-west corner of the enclosure. Two rows of roughly paired posts could represent a rectangular structure. A similar nucleation of recut postholes was found 40 m. east of the southern entrance in 1970.

Outside the south side of the enclosure and parallel with its ditch was a negative lynchet. Ploughmarks were visible running along the slope where the share had cut into solid chalk, so making the lynchet. Just west of the entrance the negative lynchet turned downhill, marking a field corner. Sixty metres to the south the lower side of this field is marked by a prominent positive lynchet. This was sectioned by a cutting 17 m. long by 2 m. wide (Plate V). The lynchet had accumulated to a maximum depth of 1.7 m. Below it was a shallow ditch which curved to the west away from the present positive lynchet



Plate V Bishopstone 1975. Lynchet section showing ditch and two postholes below bank. Scale 2 m. (Photo: B. Westley)

line. Some ploughmarks were however parallel to the ditch and it may represent an early marking out ditch or field boundary. On the lip of the ditch were two postholes that may represent a fenceline associated with the lynchet's formation. The south edge of the ditch had been eroded away by the negative lynchet of a field lower down the hill. This had subsequently been buried by the forward creeping positive lynchet of its higher neighbour. The lynchet evidently had a complex history and in an attempt to relate specific



Fig. 6 Bishopstone 1975. Plan of Anglo-Saxon features.

levels to periods of cultivation, each find of pottery and flint, totalling 1,985 artefacts, was three-dimensionally plotted. Preliminary examination of these finds shows that the field was in use throughout the Iron Age and during the Romano-British period. It was not cultivated after the beginning of the 5th century when this field was covered by buildings. Soil samples were taken at intervals of 5 cm. in a column. Land snails extracted from these should give some idea of environmental conditions as the lynchet accumulated. These results may be compared with mollusc faunas from the numerous ditch and pit silts covering some 3,000 years of occupation on the site. All traces of lynchets and earthworks on Rookery Hill are currently being surveyed and there appear to be fields outside the Early Iron Age enclosure on its east and south sides. There can be little doubt that they are contemporary fields related to the settlement.

No features of the Late Iron Age were located in 1975. Pottery of saucepan pot and later types is concentrated in the north-east part of the earlier enclosure, as are the Romano-British features.

Anglo-Saxon (Fig. 6)

This season has produced a further seven structures of this period. One is a sunken hut and six are rectangular timber buildings of many small posts and easily distinguished from the larger Iron Age postholes. Only the bottom few centimetres of some postholes were preserved and the plans of several buildings show that other postholes have been totally obliterated.

Structure XXXII was the west end of a rectangular building, most of which lies outside the excavation. It was 4 m. wide with two large, oval posts in the middle of its gable end. Only one corner was preserved and here there was a double posthole.

Structure XXXIII is 4.7 x 3.2 m. of small, shallow postholes. It lacks corners and may have been an unroofed enclosure or pen.

Structure XXXI is a line of five postholes of similar dimensions. They probably represent one wall of a rectangular structure, the greater part of which lies north of the excavation.

The largest structure is number XXXVII, a large bow sided hall of length 10 m. and width 4 m. (Plate III). The side walls were of paired posts. In the centre of the side walls were doorways of width 70 cm., flanked by oval postholes which appeared either to have been recut or to have taken two timbers. Corner posts are absent and there are only gable posts on the west end where they are very shallow and almost obliterated by the plough.

Structure XLIII appears to be a rectangular building of which only the south corner is totally preserved. This corner consists of paired contemporary postholes. Four oval postholes mark doorways and in the case of the northern doorway a small post probably took the door itself. It is suggested that this doorway was in the centre of the longest side and thus that the building's dimensions were 8.5 m. x 4 m. If this is the case, then only two shallow holes remain of its eastern half.

Structure XXXV is of large single posts forming a rectangle of width 3.5 m. The south end lies outside the area excavated. A small post inside the east wall probably marks an entrance and if this is in the centre of that wall, the building was of length 7.5 m. Postholes of the gable walls were shallower than those of the side walls. Most holes contained abundant charcoal, showing that this structure was destroyed by fire. Trodden into the soft fill of the Iron Age ditch which underlay structure XXXV was part of a small Anglo-Saxon jar with oblique fluting on its body. One posthole produced a rim sherd similar in fabric and form to those from the cemetery.

Structure XLVIII (Plate IV) is the third sunken hut excavated at Bishopstone. It consisted of a pit 3.8 m. x 3.4 m. and 1 m. deep. Two large postholes were cut into the base and both were replaced during the building's life. In the floor were dozens of small, circular stakeholes, apparently man-made. The pottery was of two fabrics, one hard fired with a quartz sand filler, in one instance decorated with a rosette stamp. Other sherds were less well fired with a filler of small multi-coloured grits, and some showed signs of vegetable inclusions. Small finds included a pottery spindle whorl, six bone points or needles, and fragments of bronze. The Saxon population at Bishopstone evidently exploited marine resources and the sunken hut contained numerous marine molluscs, particularly mussels which were also found in most of the Anglo-Saxon postholes. The sunken hut had only one other posthole nearby, on its northern edge, and there was no evidence to suggest that it was part of a larger rectangular building.

In addition to these postholes, which form part of recognisable structures, 36 other postholes are of a size and shape which suggests an Anglo-Saxon date. Several form rows and can probably be interpreted as the remains of fencelines largely obliterated by the plough.

This brings the total of Anglo-Saxon buildings excavated at Bishopstone since 1967 to 20 (structure numbers include Iron Age buildings). Of these at least 8 are large rectangular 'hall type' buildings and 3 are sunken huts. Pottery scatter suggests that Anglo-Saxon occupation covers an area of perhaps 3 hectares, of which only a small part has been excavated. The settlement is comparable in size, building plans and spur-top location with that at Chalton, Hampshire (Addyman and Leigh, 1973: 1, and Addyman, Leigh and Hughes, 1972: 13). The finding of buildings close to the Anglo-Saxon cemetery and of pottery sherds from postholes and sunken huts identical with those from the graves leaves little doubt that the settlement, at least in its early phases, was contemporary with the cemetery. Provisional dating for the cemetery is 5th and 6th century AD (Wilson, 1968: 161).

Acknowledgements

These excavations were a joint project by the Field Unit and the Brighton and Hove Archaeological Society. They were made possible by the co-operation of the farmer, Mr G. White. The excavation staff were Misses P. Norman, E. Guy, J. Foster, S. Hamilton, Mrs B. Westley, Messrs Green, Makin, O'Shea and Mr and Mrs K. W. Suckling. I am grateful to all those who have assisted in the eight seasons of excavation at Bishopstone.

IV. A field survey of Oving and District with a trial excavation of an Iron Age site at North Bersted, West Sussex

by M. W. PITTS

For 1 week during the winter of 1974–5 a field survey was undertaken on the Coastal Plain east of Chichester. The aim of this survey was to test the archaeological potential of the Plain and its responsiveness to field-walking.

The results seem to show clearly that the area was no less intensively exploited before historical times than it has been since the beginning of the detailed record keeping which has earned the Plain a prominent position in studies of medieval farming. Sites of Mesolithic, Neolithic, Iron Age, Roman and medieval date were located. The great majority of the material recovered fell into three distinct groups: struck flint and flint implements, Roman pottery and tile fragments and a wide range of post-medieval artefacts. The Iron Age and medieval pottery was all very small and generally only identifiable by fabric. One small Neolithic sherd was also found. This pattern of survival can safely be attributed to differential destruction under conditions of continuous cultivation. Struck flint alone is virtually indestructible, and in future work it is hoped to concentrate on the interpretation of the distribution of these particular artefacts. For maximum information retrieval, it is important that a regular, if arbitrary grid is used as a basis for recording, rather than a 'grid' of field boundaries. Such a system would facilitate the construction of a density surface reflecting the distribution of flint artefacts, which could provide a basis for detailed work of great potential interest.

Trial excavation in Hazel Road, North Bersted

Trial excavations in advance of housing development on the outskirts of Bognor Regis (SU 931 010) revealed a long sequence of occupation, perhaps spanning several millennia (Fig. 7). The earliest feature recorded was a hollow c. 1.20 m. by 2.00 m. in plan and 0.70 m. deep, which produced a few pieces of struck flint of general Mesolithic character, including a narrow blade with end-retouch. It is conceivable that this feature was in fact contemporary with a cultural deposit of undetermined extent, but at least 10 m. square, which produced a number of struck flints and half a dozen decorated Beaker sherds. The latter feature was cut through by the ditch of an Iron Age rectangular enclosure of unknown size. From the ditch fill came quantities of pottery of the Saucepan pot continuum, as well as slags and crucible fragments indicating the existence of metal-working in the near vicinity. Apparently contemporary with the ditch was a circular pit 1.50 m. in diameter and 1.00 m. deep, which contained a hearth 40 cm. from the top. Also excavated was a stretch of ditch of Belgic or early Roman date. Building operations about 250 m. to the west of the excavations have recently exposed a ditch containing much immediately post-Conquest Roman pottery. Among the finds from the excavations (but unstratified) was half of a blue glass 'eye-bead', with yellow and white spirals on raised bosses.

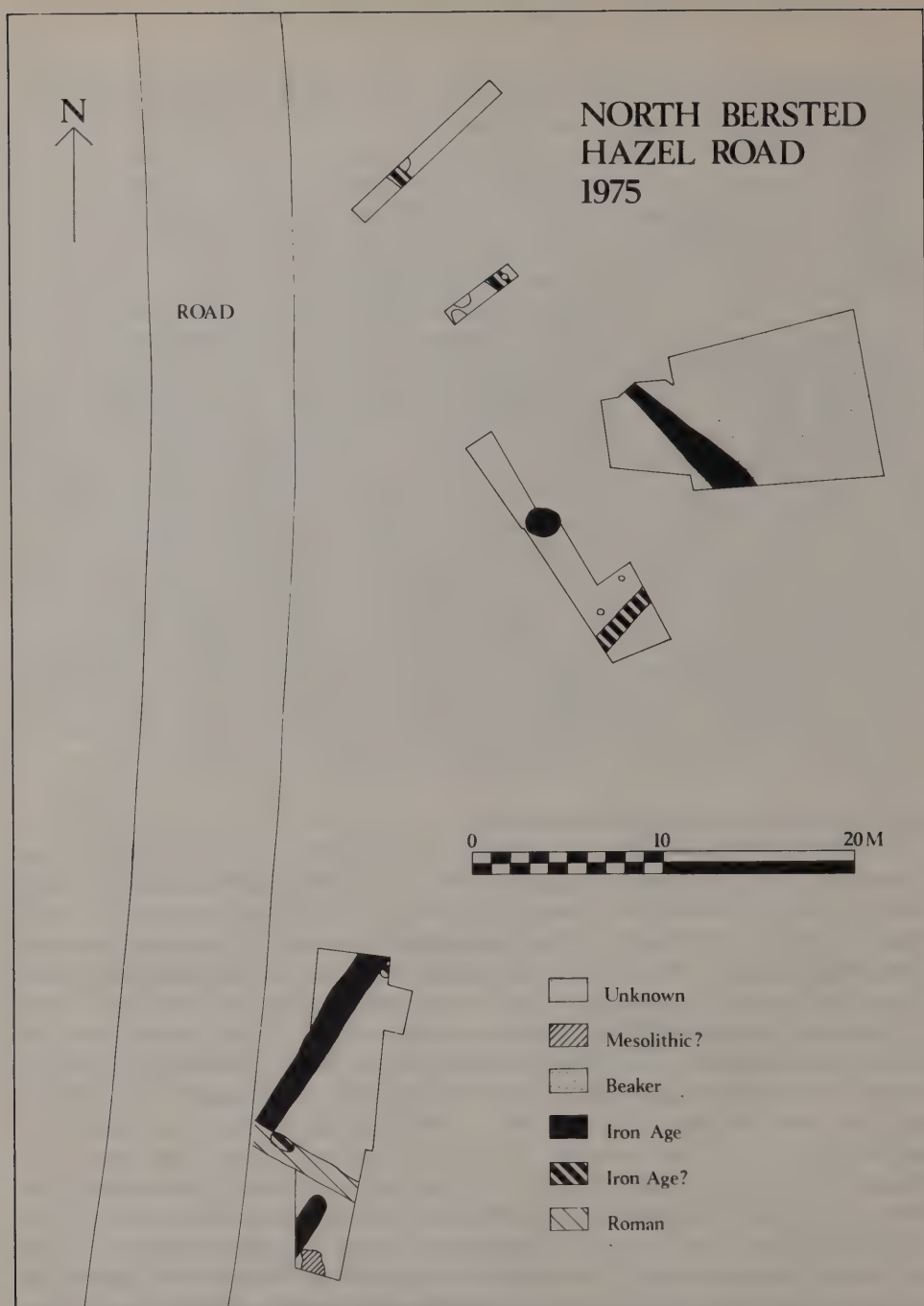


Fig. 7 North Bersted 1975. General site plan.



Plate VI Elsted 1975. Boundary ditch. Scale 2 m. (Photo: M. Redknap)

V. A trial excavation of a Romano-British site at Elsted, West Sussex

by M. REDKNAP and M. MILLETT

Excavation was undertaken on this Chalk outlier of the South Downs (SU 812 190) to establish the extent of plough damage and produce a sequence of material from the area. An area was selected, in the centre of the plough scatter found in the 1974 field survey (Bell and Tatton-Brown, 1975) and approximately 500 m. square of clay with

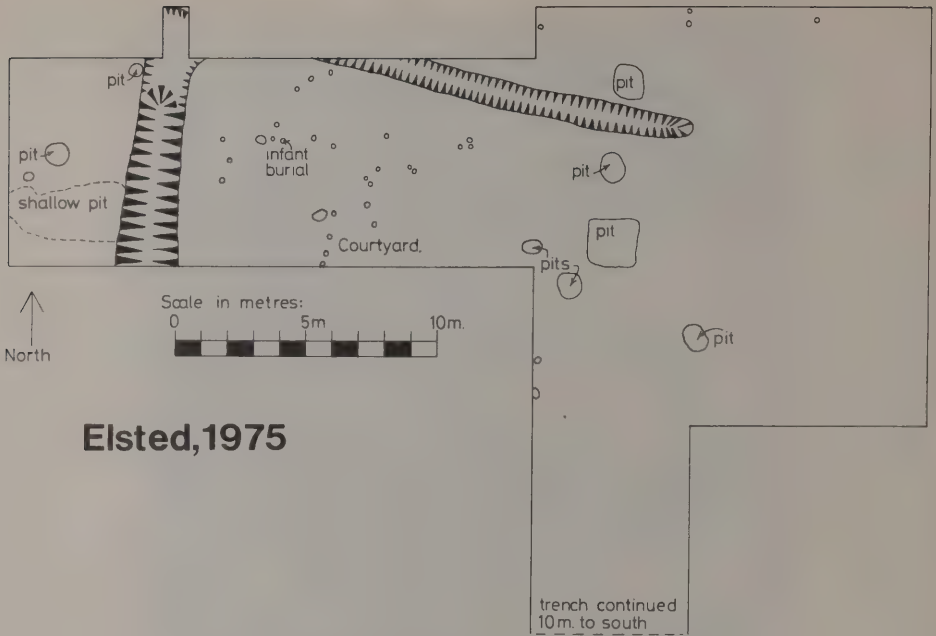


Fig. 8 Elsted 1975. Plan of Romano-British features.

flints was cleared to reveal a courtyard enclosed on two of the three sides excavated by a ditch first cut in the early 2nd century AD (Fig. 8). It was recut to a shallower depth at some time in the early 3rd century AD (Plate VI). Within the enclosure a layer of occupational debris (up to 10 cm. thick) was excavated using a metre grid. Within and beneath this were over 30 postholes of differing dimensions, none of which form any obvious structures, although several phases are indicated. A number of flat-bottomed pits were revealed (Plate VII), one of which produced an infant burial. These all fall within the same chronological range (early 2nd to mid 3rd century AD), although one pit which produced no pottery at all may not be Roman. The surface scatter indicates that occupation continued into the 4th century AD though no later features were identified.

Aerial photographs taken during the excavation showed a crop mark to the north of the excavated area resembling a three-roomed stone building (about 15 m. by 15 m.) whose existence was confirmed by resistivity traverses.



Plate VII Elsted 1975. Romano-British pit. Scales in centimetres and decimetres. (Photo: M. Redknap)

VI. Further excavations at the Romano-British iron-working site at Broadfield, Crawley

by J. GIBSON-HILL

This is the second and final interim report on the 'rescue' excavations of the Iron Age and Romano-British iron-working settlement at Broadfield (TQ 258 353). As with the previous report (Gibson-Hill, 1975), there will be a brief summary of the significant finds made during 1975, and in addition the method of operation of the ironworks will be discussed and comparisons made.

Site II (Fig. 9)

Work on the site finally came to a halt in August 1975 with the excavation of a slag dump situated on the western side of the enclosure (Fig. 9). Unlike the slag-dumps of the 'Coastal Group' of East Sussex and Kent (Cleere, 1970; Rock, 1879; Straker, 1931), which show separate stratified layers of slag, burnt clay and charcoal (the single-material layers gave rise to the suggestion of cylindrical operations related to the various stages of



Plate VIII Crawley 1975. Base of shaft type smelting furnace, sectioned and showing sandstone reinforcement. Scale 2 m. (*Photo: P. Wyles*)

the process) (Cleere, 1971b), the dump examined on Site II gave the impression that it was formed by a series of relatively small quantity tippings (no larger than the load of a wheelbarrow) of tap-slag fragments. Besides the slag the occasional lens of burnt clay furnace superstructure and charcoal were located. The dump, oval in plan, covered an area measuring 31 m. x 22 m. Like the other example on this site (Fig. 9) the dump seemed to be truncated; disturbance at the surface, associated with medieval and post-medieval pottery, could be taken as an indication of the dump being robbed.

Below the slag-dump and sealed by a consistent layer of tiny roasted ore fragments and 'fines', there was an oval ore roasting area approximately 12 m. in diameter, set into a slight hollow. The surface, burnt-red, was interrupted by areas showing the effects of exposure to more intense heat where the clay was hard and black or yellow-orange in appearance (Gibson-Hill and Worssam, forthcoming). The roasted ore was mainly a red-purple colour, but a number of black pieces were found together with several unburnt ore nodules.

To the west of this area, but still beneath the slag-dump, the bases of 6 shaft type smelting furnaces were discovered. Four had cylindrical clay superstructures with an aperture for forced draught and slag-tapping (Cleere, 1972, Type B.I.i). These were of the

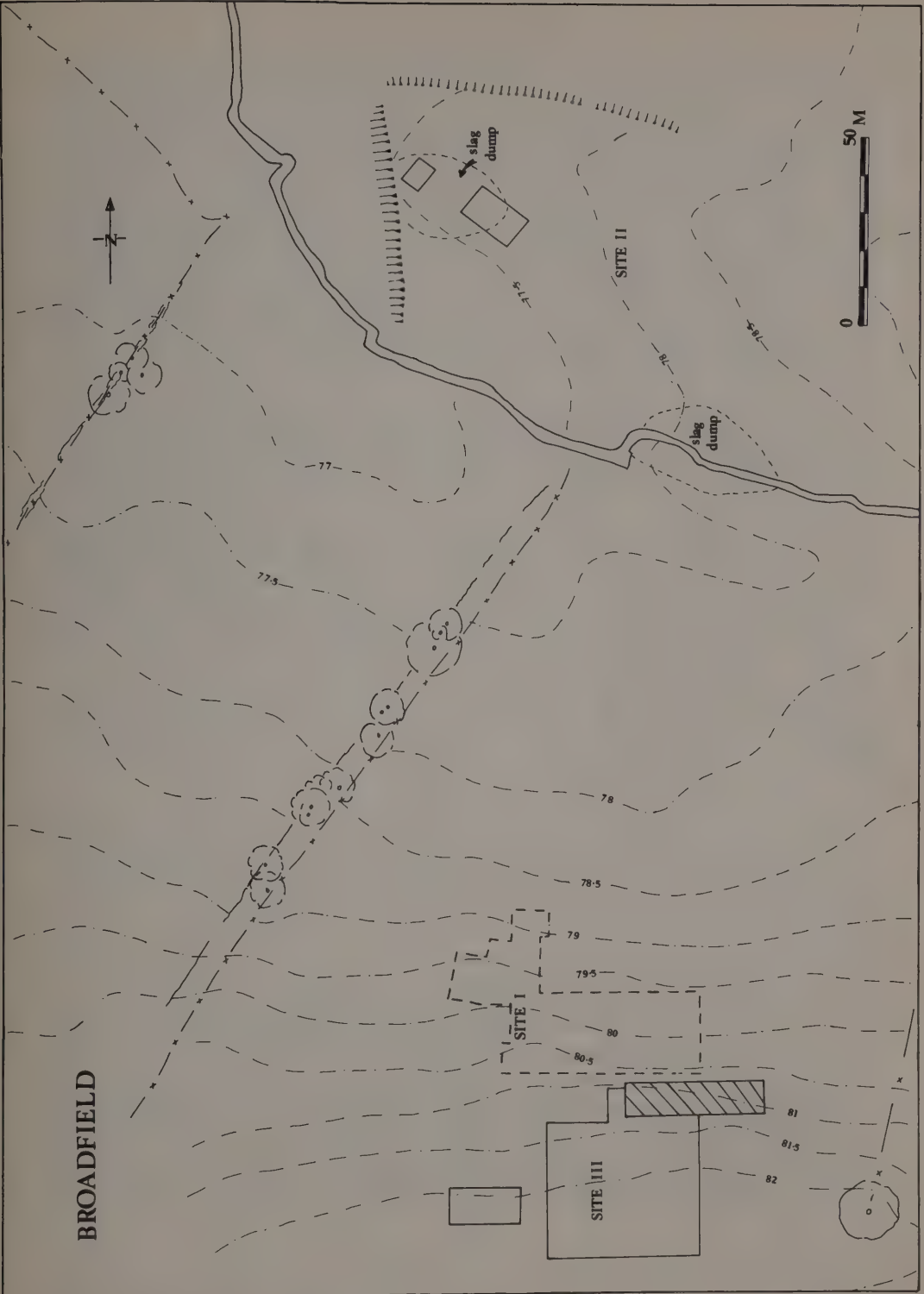


Fig. 9 Crawley 1975. Contours at 0.5 m. intervals. The hatched area is shown in more detail in Fig. 10.

'Classic Wealden' type, with the characteristic free-standing superstructure. The other two furnaces were similar to those described above, except that they were equipped with a communal tapping-bay and the base of the furnace sloped from the back to the front. It was quite clear that these furnaces were probably the survivors of a row of either a 3 or 6 furnace grouping, similar groups have been discovered elsewhere on the site (Gibson-Hill, 1975). However, these had been formed by the shafts being recessed into a low clay bank. Examples of this type are known from Stamford (Tylecote, 1969) and Ashwicken (Tylecote and Owles, 1960). It is possible, therefore, that the two furnaces found on Site II represent an early prototype for the more advanced 'Ashwicken' furnace.

Small finds from this site were scarce but sufficient for a provisional examination of the pottery to indicate a mid to late 1st century AD date.

Site III (Fig. 10)

At the time of writing, the bulk of this area is still being investigated. However, part has been completely excavated (the hatched area on Fig. 9) and the west end of this is illustrated in Fig. 10 (Plate IX).

Phase I: Consists of a ditch probably circular in plan, measuring approximately 8.5 m. in diameter. In section it was found to be 'V' shaped, 84 cm. wide at the top, tapering to a pointed base 69 cm. deep. Inside the area delineated by the ditch and contemporary with it there was a beam-slot, irregular shaped in plan. A group of double post-pits was situated a short distance from the south-east and south-west corner of the structure. At some stage post-pits 1 and 2 seem to have replaced 3 and 4.

To the east of this area a small 'domestic' hearth was discovered; this had been cut into by the perimeter ditch that runs north-south through Site III. Towards the end of this phase, the building was levelled; tiles, nails and domestic debris being deposited in the perimeter ditch.

Phase II: Apparently after a short hiatus the area was converted to industrial activities. The ditch which had encircled the building was well silted when ore roasting operations were started near its southern bank. Soon the remainder of the ditch was filled with charcoal and roasted ore. Finally to be 'topped-up' by tap-slag, the waste product of the smelting process.

Replacing the building, a rather unusual series of smelting furnaces was constructed:

- (1) Furnace no. 1. This unusual shaft type smelting furnace was set into a pit 89 cm. deep. It had been lined in puddled clay which was reinforced with several courses of sandstone blocks. The remains stood 76 cm. high and had an internal diameter of 80 cm. (Plate VIII).
- (2) Replaced by a more normal shaft type smelting furnace which was constructed on a raised clay base set into the shaft of furnace no. 1.
- (3) This was eventually levelled, and ore roasting was carried out in a pit formed in the previous tapping-bay and front arch area.

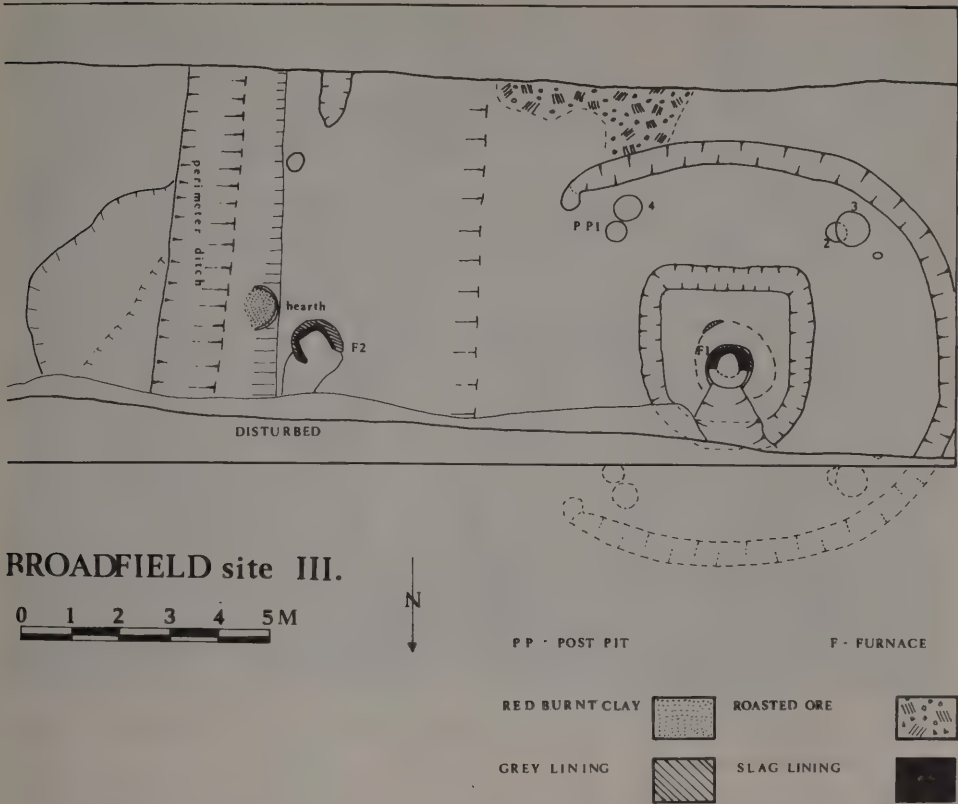


Fig. 10 Crawley 1975. Plan of furnaces at west end of site III.

- (4) A further alteration saw the construction on a prepared clay insert set into the ore left as residue in the pit described above (3) of the final shaft type smelting furnace.
- (5) In its final form, this furnace was modified by reducing its superstructure (probably to ground level) and sealing the front arch off with clay and sandstone blocks to create a forge, oval in plan.

Also associated with this phase was the construction of a more conventional furnace (Furnace 2) on the western side of the perimeter ditch (which had now fallen into disuse). Again the furnace had been cut into a shallow pit 53 cm. deep. All of the smelting furnaces were equipped with facilities for forced draught and slag-tapping, thereby resembling Cleere's classification B.I.i. (Cleere, 1972). However, these are not free-standing as indicated, which suggests that a revision of this method of classification



Plate IX Crawley 1975. Plan view of Romano-British building on Site III. Scale 2 m. (Photo: P. Wyles)

is in order, to include furnaces that are not free-standing yet have all the prerequisites of group B.I.i.

Method of operation

While probably being an over-simplification there does appear to be two areas of iron-working in the Weald, separated geographically and with different methods of administration and operation (Cleere, 1975, and Gibson-Hill, 1975).

Coastal group

A 'Coastal Group', facilitated in part by sea-borne transportation, provided by the *Classis Britannica*. Their primary area of activity seems to be centred around the Battle/Sedlescombe district, with a secondary sphere of influence spreading inland to include Bardown and its satellites. Connections with the Fleet have been firmly established by the discovery of roof tiles stamped CLBR at the industrial settlements of Bardown (Cleere, 1970), Beauport Park, Little Farningham Farm and the port at Bodiam (Brodribb, 1969). The excavations at Bardown have proved to be informative as far as methods of operation are concerned. The settlement was founded in the mid 2nd century AD. There was a

domestic settlement associated with two rectangular trench-like ore roasting furnaces. This 'limited' industrial activity ceased at the beginning of the 3rd century AD. During the following phase the domestic area continued to be used, and it was at this time that the CLBR stamped tiles were introduced. Contemporary with the change of emphasis at Bardown, the only satellite site to be excavated was established at Holbeanwood. Here two groups of six free-standing shaft type smelting type furnaces were located (Cleere, 1970).

The need to establish satellite sites has been explained as an effect caused by local 'ore' exhaustion.

Little Farningham Farm and Beauport Park may well be other settlements serving as the nucleus for groups of satellite sites. From this one would see the Fleet fulfilling an administrative role, overseeing a number of iron-working sites from these centres, collecting and forwarding the product to Bodiam for transportation.

'Mid Wealden' group (Gibson-Hill, 1974, 1975, and Cleere, 1975)

This group was certainly dependent on the London to Brighton (Margary, 1936) and the London to Lewes Roads (Margary, 1932: 33). Both roads were constructed towards the end of the 1st century AD with whatever material was found nearby (Margary, 1965). For much of the distance this meant bloomery slag. This is significant because it has been suggested that the very construction of these roads led to the discovery of ore outcrops and to the founding of sites in this area (Cleere, 1975). However, sections across the roads show that slag was used in the initial construction, indicating that the production of iron was carried on prior to and including the period of construction. The area of slagging on both roads could be indicative of the distribution of the iron-works of the 'mid-Wealden Group' at that time. It would seem more probable that ore was located by surveying the sides of valleys which streams have cut deeply through the relatively soft clays and sands, exposing outcrops. This method would equally apply to both the 'Coastal' and 'mid-Wealden' groups, e.g. the River Limden at Bardown and a tributary of the Mole at Broadfield. At Broadfield ore roasting was carried out in circular depressions similar to features found at Ridge Hill (Straker, 1931), and are quite unlike the trench furnaces found at Bardown (Cleere, 1970).

Superficially there seems to be little in common with the techniques illustrated by the excavated 'mid-Wealden' sites such as Broadfield, where the ore-workings, industrial and domestic areas cover 12 hectares, and the 'Coastal' sites. But closer examination shows that there are in fact many similarities. For example, the vast majority of the smelting furnaces (32) found at Broadfield are of the classic 'Wealden' type as were those excavated at Holbeanwood. Also the double tuyeres from both areas are remarkably alike, the most common being manufactured out of clay and moulded into a 'trumpet mouth' form, each having two diverging holes approximately 25 mm. in diameter, starting inside the trumpet mouth. The tuyere allows a blast of air to be introduced into the combustion zone of the furnace. Examples of this type have been found at Crowhurst Park, Bynes Farm, Little Farningham Farm, Bardown and Broadfield (Cleere, 1963).

In fact there appear to be only two major differences, the method of transportation and adaptations to local geological variations. At Broadfield the ore was obtained from the Weald Clay (Gibson-Hill and Worssam, forthcoming). The remains of minepits covering more than 40 hectares are still visible (Worssam, 1972). These are, of course, undated and much of the mining in this area must have been associated with the later iron-works, but their presence indicates that shortage of ore did not affect the Broadfield settlement, allowing static development unlike those of the 'Coastal' Group, who were working ore from the Wadhurst Clay, where ore exhaustion appears to have been a contributory factor in the setting up of satellite sites.

Unlike the 'Coastal' sites, those of the 'mid-Wealden' Group have low profile slag-dumps, possibly the result of robbing for building material or for use as part of the burden in blast furnaces (Armstrong and Gibson-Hill, forthcoming). Earlier researchers used the discovery of a slag-dump as an indicator of the presence, type and to some extent the size of a site. The evidence from Broadfield implies that a fresh approach to field-work in the 'mid-Wealden' area may well add to the number of iron-working settlements.

Dating

Straker and others (Schubert, 1957) considered a number of iron-working settlements were of a pre-Roman foundation date. There is, however, growing scepticism about this continuity. Apparently only the mid-Wealden sites stand up to scrutiny, as some of the sites, such as Ridge Hill, East Grinstead; Oldlands, Maresfield; Great Cansiron, Holtye; Broadfield, Crawley and Walesbeach, East Grinstead have provided evidence dating them to the latter part of the 1st century AD or earlier. Both Great Cansiron and Oldlands have yielded coins of Vespasian. The relatively lengthy working life of these sites is indicated by the coin sequence at Oldlands, which ranges as late as Diocletian (286 AD).

Earlier difficulties with Carbon 14 dating resulted in a reluctance to apply this technique to Wealden Iron sites. Apparently a number of analyses produced dates which were approximately 200 to 300 years later than the age indicated by small finds. This report is not the place to discuss this anomaly, it is sufficient to say that recently results from a number of sites (Table 1) illustrate that the technique can be used with successful results. So far these prove a pre-Roman date for the origin of mid-Wealden iron working (Fig. 11).

Acknowledgements

I should like to thank the Crawley Borough Council and the Commission for the New Town for permission to work on their lands. I should also like to thank S. Broucker, P. Hopkinson, R. Kerr, C. Pratt, K. Young, P. Timlett and P. Bratcher for considerable assistance. Finally, I should like to thank various specialists for their help, particularly D. Butler, B. C. Worssam, B. Otlet, P. Ovenden, D. Tarlin and H. Keely.

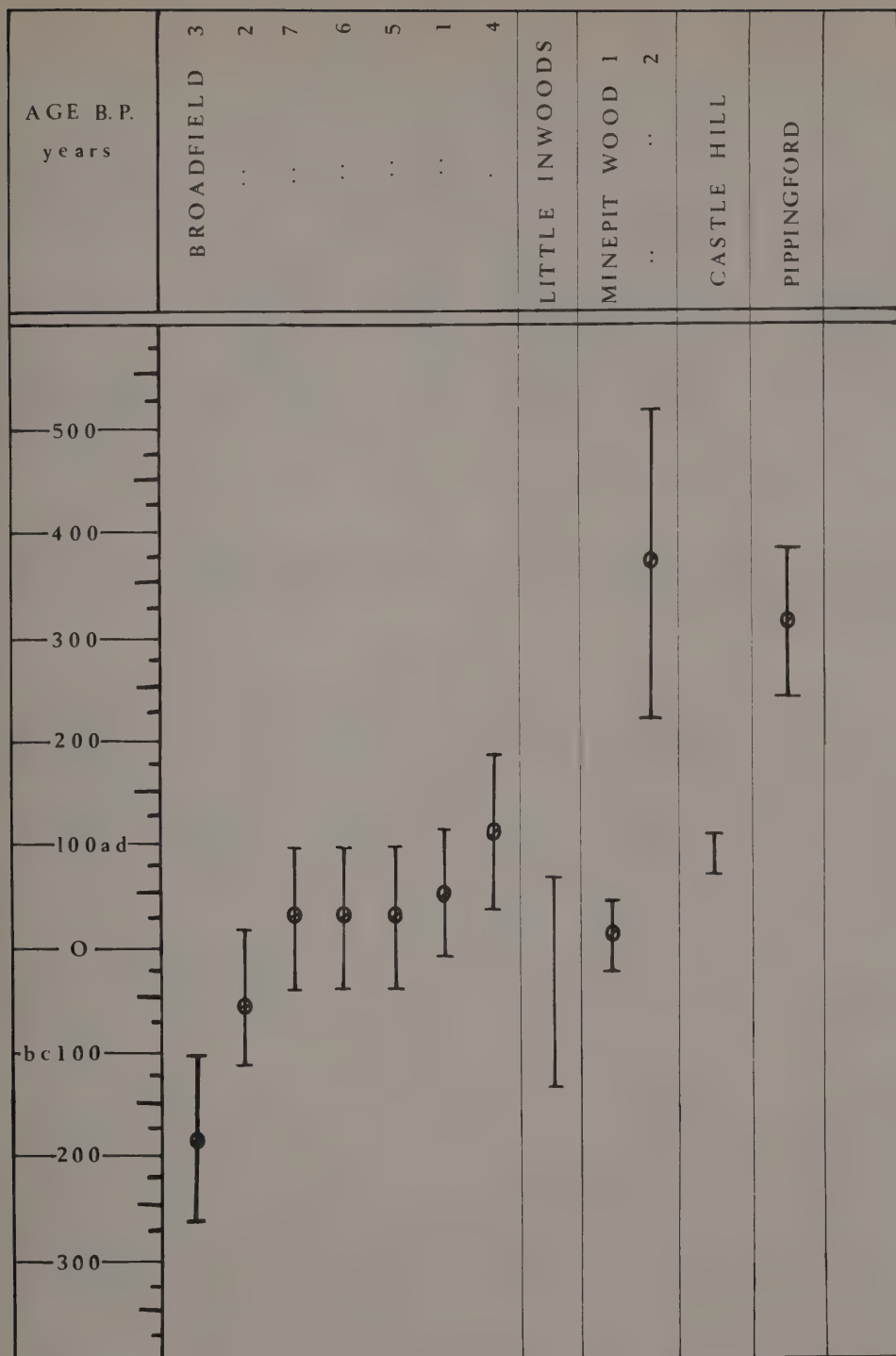


Fig. 11 Crawley 1975. Carbon 14 dates for Broadfield and comparable Wealden iron working sites.

TABLE 1

<i>Site</i>	<i>Lab. No.</i>	<i>Ag BP Years</i>	<i>BP-1950</i>	<i>Masca Corrected Date</i>	<i>Reference</i>
Castle Hill	Hv 2984	—	ad 60-90	—	Cattel 1970 and 1971
Little Inwoods	Hv 2985	—	130 bc-70 ad	—	Cattel 1970 and 1971
Broadfield 1	HAR 559	1900 ± 60	ad 50	70 AD	—
Broadfield 2	HAR 970	2010 ± 60	60 bc	60-10 BC	—
Broadfield 3	HAR 971	2140 ± 80	190 bc	370-210 BC	—
Broadfield 4	HAR 972	1840 ± 80	ad 110	130-140 AD	—
Broadfield 5	HAR 973	1920 ± 70	ad 30	60 AD	—
Broadfield 6	HAR 974	1920 ± 70	ad 30	60 AD	—
Broadfield 7	HAR 975	1920 ± 70	ad 30	60 AD	—
Minepit Wood 1	BM 363	1949 ± 43	ad 1	60 BC-50 AD	J. Money 1974
Minepit Wood 2	BM 267	1610 ± 150	ad 340	370-390 AD	J. Money 1974
Pippingford Park	BM 685	1647 ± 60	ad 303	290-320 AD	Tebbutt and Cleere, 1973

VII. Excavations on the line of the Lewes By-pass at Saxonbury, Lewes, East Sussex

by O. R. BEDWIN

In 1891, the digging of foundation trenches for a house on the south-west edge of Lewes revealed a number of Anglo-Saxon graves (Sawyer, 1892). Later, more were brought to light during the laying-out of the garden to the east of the house; 32 graves in all were discovered. The site was not methodically explored, however, and only those burials in the way of building operations were investigated. Thus the extent of the burial ground was not established. The area surrounding the house and garden has therefore always been considered of potential archaeological interest, since it might plausibly contain further graves or perhaps a settlement site.

The plans for the construction of Lewes By-pass (now under way), included a link-road running across land immediately to the south of the house (now called Saxonbury), and it was decided to excavate a strip of land c. 70 m. by 20 m. where the line of the road passes closest to the house and garden (Fig. 12).

The excavated area was on the south-facing slope of a low chalk ridge running east-west. Excavation simply involved stripping topsoil down to the underlying chalk by machine. The chalk was then trowelled clean and the features cut into it excavated. The rather disappointing results are shown in Fig. 12. Trench Y was totally barren. Trench X contained very few features, to none of which can be assigned a date earlier than medieval. The two narrow ditches, A and B, both contained small sherds of 14th/15th century pottery, although one rimsherd of Iron Age pottery was recovered from the former. The function of these ditches is uncertain; the shallow pits, C-H, are equally enigmatic. Pit H was sterile; it seems to be a natural feature. For all the other pits, tree

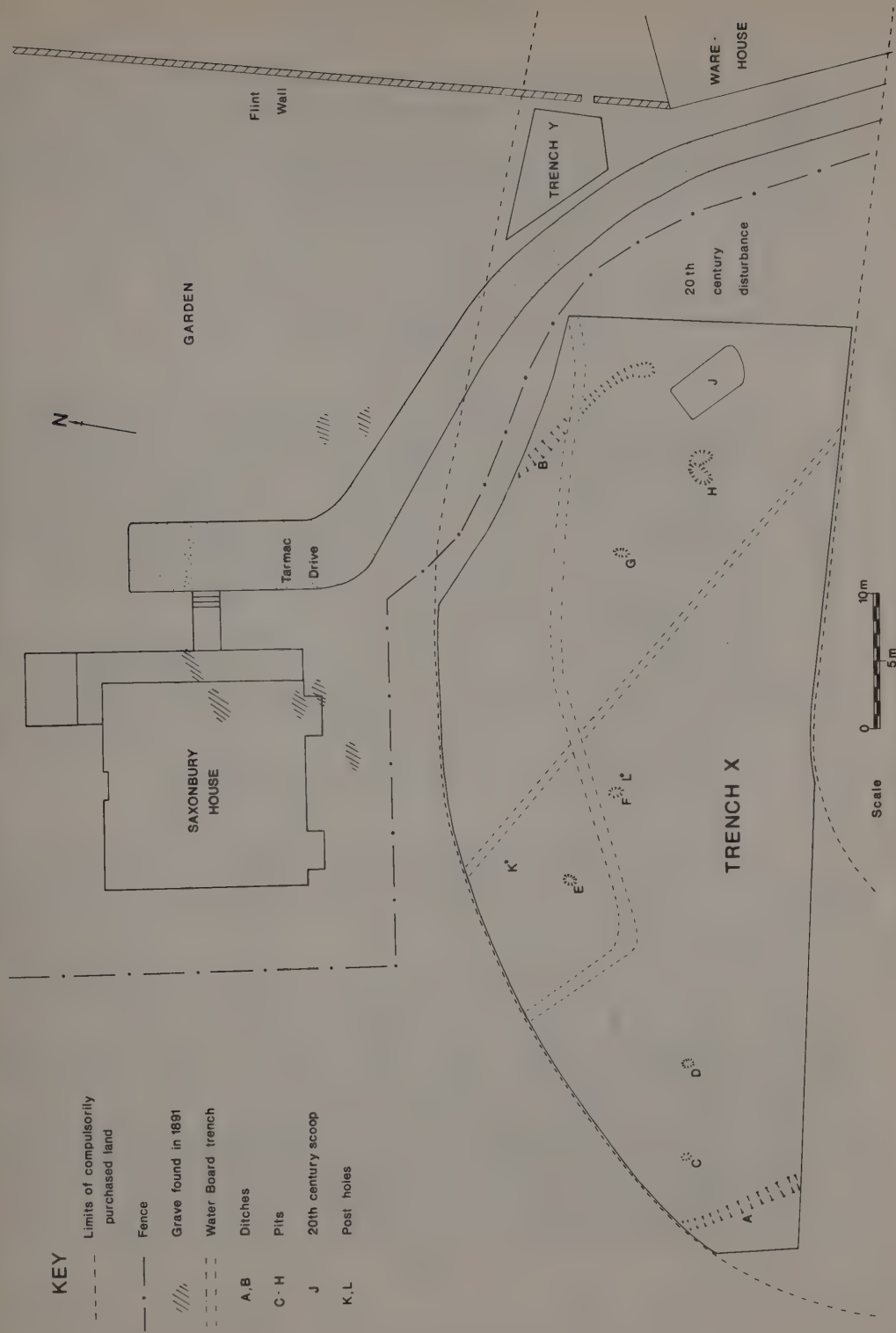


Fig. 12 Saxonsbury 1975. Site plan of area excavated to south of Anglo-Saxon cemetery.

root disturbance is the most likely explanation, although pit F did yield part of a heavily-patinated Neolithic axe. No grave nor any other trace of Anglo-Saxon occupation was found in spite of the fact that the northern edge of Trench X was only 5 m. from the southernmost grave recorded in 1891. The negative evidence provided by the excavation does at least strengthen the possibility that the settlement corresponding to the burials lies further along the chalk ridge to the west.

VIII. Further excavations in Lewes, East Sussex

by D. J. FREKE

Previous archaeological excavations and observations in north-east Lewes indicated that the site of recently demolished 19th century houses in North Street would produce useful evidence of late Saxon and Norman occupation (Freke, 1976). Accordingly, permission was obtained from the Lewes District Council to carry out excavations to check these earlier suggestions and provide, hopefully, a substantial group of local Saxo-Norman pottery from an archaeological context. The excavations were carried out by the Sussex Archaeological Field Unit with the help of the Lewes Archaeological Group under the direction of the author from 28 June to 9 August 1975.

Two areas 42 m. apart at each end of a block were opened to check the possibility of development either towards or away from the centre of the town along the line of North Street, whose name and relation to the town denotes its possible antiquity. The disposition of the trenches was influenced by cellars and the proximity of a main road, the northern Trench A being aligned approximately east–west along Wellington Street and Trench B, at the southern end, being aligned north–south (Fig. 13c).

Trench A (Fig. 14a)

The excavated area was 9 m. by 19 m. The cellars at the western end of the trench and the garden soil was cleared by machine. The cellars were 1.5 m. below present ground level at their deepest and an estimated 50 cm. to 70 cm. of natural had been removed by them at the eastern end of the trench.

Apart from 19th and 20th century pipe trenches, postholes, cess-pits and wells, all the features were medieval (Plate X). No evidence of occupation later than the 13th century or earlier than the 11th century was found. The medieval features were all pits except for one possible posthole (F 26), and a disturbed area flecked with charcoal bordered by the merest suggestion of postholes (F 25).

Five of the pits (Fig. 14a, nos. 6, 22, 29, 55, 59), varying in depth from 5.5 m. to 1.5 m., were all dug into the chalk and were square with rounded corners and near vertical sides, except for one which changed from rectangular to circular with depth (F 29). They were all roughly aligned east–west. Because of their contents, they are interpreted as cess-pits, which has the useful consequence that their original excavation

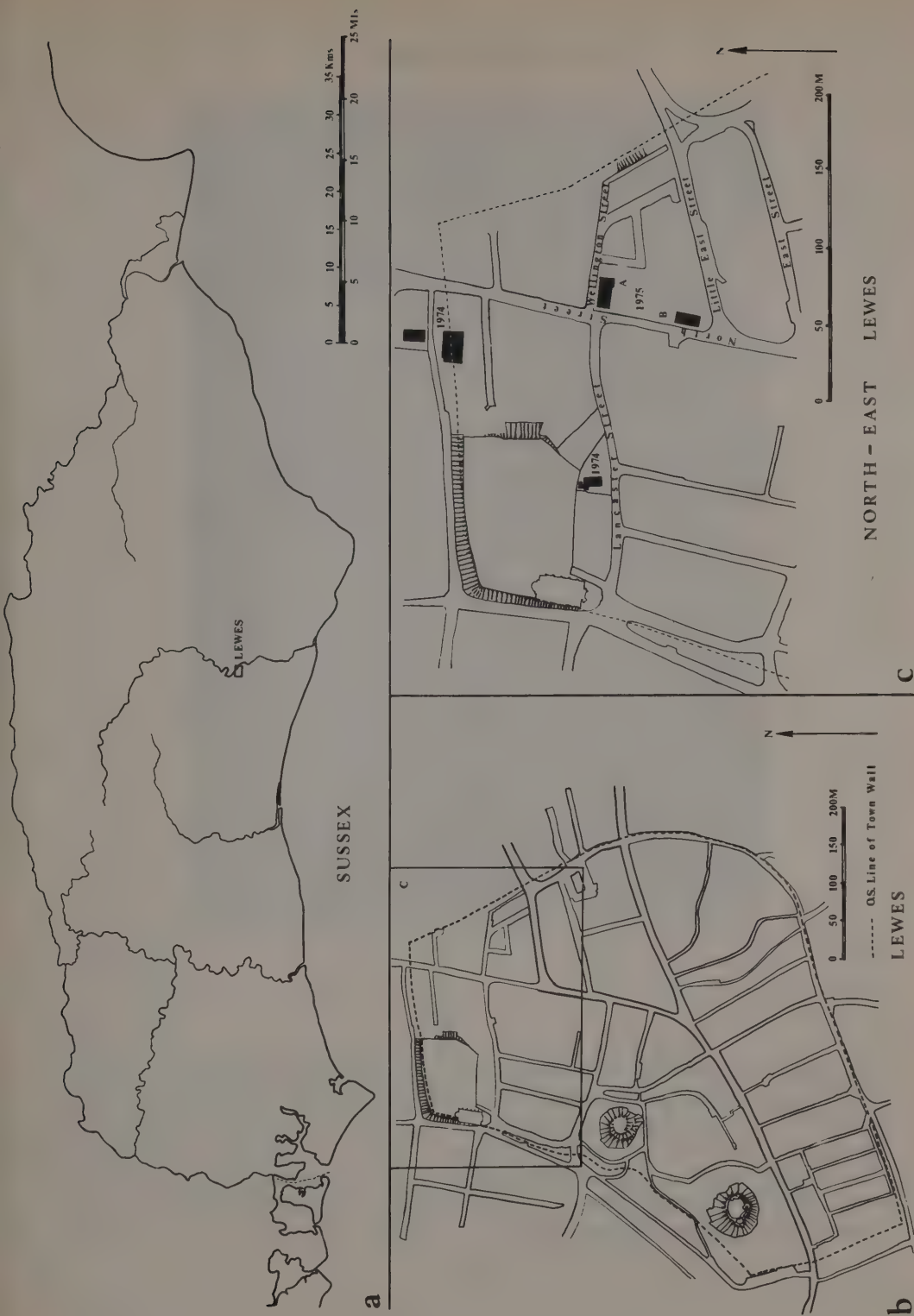


Fig. 13 Lewes 1975. Location map of archaeological sites in Lewes.



Plate X Lewes 1975. Early medieval cess-pits in Trench A from west. Scale 2 m. (Photo: D. J. Freke)

may have been sequential, with little or no overlap. All of them contained substantial quantities of pottery and bones and a preliminary examination of the pottery suggests that it may be possible both to reconstruct the order of their original excavation and to propose a relative pottery sequence. An almost complete vessel from F22 appears to be a unique form, at least in Sussex, although on the evidence of its fabric it seems to be locally made. The same feature also produced fragments of early medieval glazed ware, possibly Winchester ware (Biddle, 1974).



Plate XI Lewes 1975. Saxo-Norman pits in Trench B from south. Scale 2 m. (Photo: D. J. Freke)

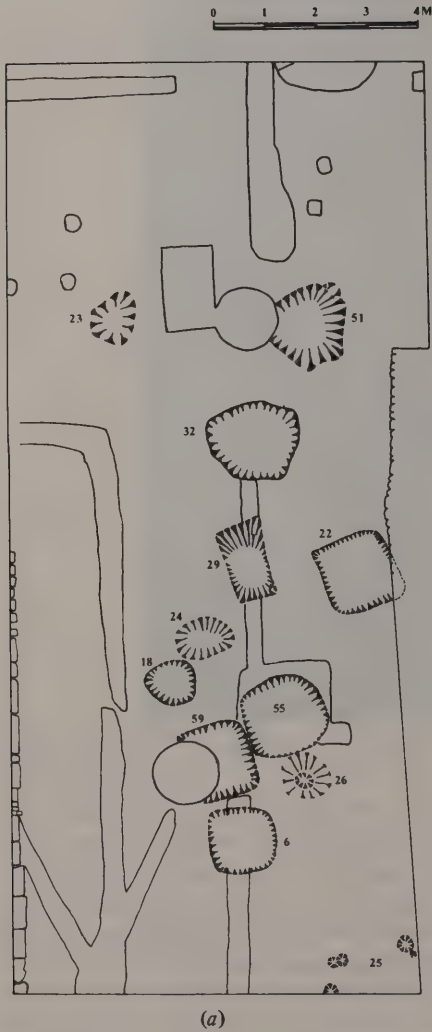
The four other medieval pits (Fig. 14a, nos. 18, 23, 24, 32, 51) were shallower, irregular in shape and of unknown function. The packing of the possible posthole (F 26) contained 13th century pottery. The disturbed area (F 25) produced no pottery or artefacts of any kind except flecks of charcoal. However, the natural in this area had been excavated to a depth of perhaps 70 cm. by the 19th century cellars, and the remains were no more than 20 cm. deep in places and considerably less in others.

Trench B (Fig. 14b)

The 19th century houses on this site had no cellars so a complete stratified sequence was observed. Under the foundations of the latest houses were the massive

LEWES '75 NORTH STREET

Trench A



Trench B

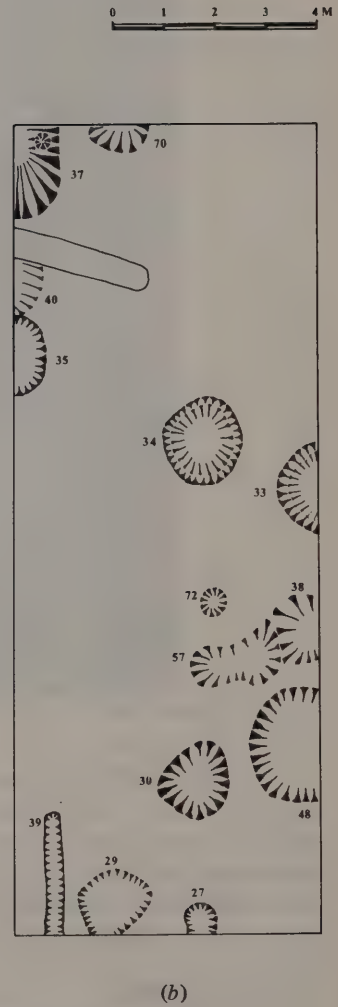


Fig. 14 Lewes 1975. North Street. (a) Trench A, (b) Trench B.

foundations of an earlier 19th century structure identifiable on the 1873 Ordnance Survey maps (first edition) but missing from Marchant's map of 1824. This structure overlay a 40 cm. thick layer of dark soil which covered most of the site and which contained 18th century clay tobacco pipe fragments in its upper portions and 13th century pottery from its considerably more flinty lower levels. This gave way to the rotted surface of the subsoil of clay, flint and chalk. The cryoturbation exhibited by this surface was examined by M. Bell.

Except for 19th and 20th century features this trench revealed only medieval features which, on the evidence of the pottery, are probably earlier than those of Trench A, with the exception of a 13th century or later beam-slot (F39). Otherwise all the medieval features were pits, but of quite a different character from those in the northern trench (Plate XI). Two (F33 and F34) were comparable in depth and general contents to the cess-pits in the lower site, but they were circular and contained earlier pottery and much charcoal. Some of the other eight pits also contained thick layers of charcoal and Saxo-Norman pottery together with 'bun' shaped loom-weights, bone needles and burnt clay (F30, 35, 37, 40, 70).

Both Trench A and Trench B produced evidence of short occupation in the Saxo-Norman period, with Trench B, nearer the present town centre, appearing to be abandoned before activity commenced on the other, although no structures could be identified on either site. Both areas were used for agricultural purposes, probably grazing, from their abandonment until the development of the nearby iron-works in the early 19th century.

The implications of this for the understanding of the development and growth of medieval Lewes are not clear. Similar pits containing Saxo-Norman pottery were found west of North Street and in the light of this year's results, the pit found and partially excavated in Lancaster Street in 1974 (Freke, 1976) must now be considered as a cess-pit also. This implies a band of settlement in the early medieval period spread across the slope north of the present town centre, but there is no archaeological evidence one way or the other whether this settlement was enclosed by the Burgh defences. However, evidence must now be sought to establish this and whether the abandonment of the sites east of North Street is the result of the town contracting or moving to the south, or for some other reason.

Acknowledgements

Many thanks are due to the Lewes District Council for their co-operation, particularly R. L. Stammers and D. B. Rippon, and also to East Sussex County Council, notably W. Lanning. My principal assistants during the excavations were Caroline Cartwright, Ian Blair and my wife Jane, who was responsible for organising the Finds Shed, assisted by Miss Joyce Biggar. Mrs Susan Thomas conserved the more delicate objects at Barbican House, Lewes, with the kind permission of Miss Fiona Marsden, the Curator. Too many individuals gave their time actually digging for me to name them all, but without their hard work there would have been no excavation.

IX. A trial excavation in Winding Street, Hastings, East Sussex

by D. R. RUDLING

During August 1975 the Sussex Archaeological Field Unit in conjunction with the Hastings Area Archaeological Research Group conducted a small excavation on the north side of Winding Street, Hastings (TQ 824 095). The excavation was undertaken to follow up the information obtained from the site during 1974 when H.A.A.R.G., under the Directorship of Mr David Devenish, excavated an exploratory trench (Fig. 15, Trench I), and to obtain further information about the medieval occupation of the site prior to redevelopment. The primary purpose of the excavation, however, was to obtain a sequence of medieval pottery to be used in future work in East Sussex.

The earliest phase found in 1974 consisted of a medieval layer lying directly on the natural yellow clay into which an oval pit had been dug. At a later phase a house platform with a line of 6 flat stones and a stone lined posthole along its western side was constructed (Fig. 15). To the east of the line of stones was a succession of floor levels. Later phases belonged to the 18th and 19th centuries.

This year two trenches were excavated parallel to that of 1974, but only one of these, Trench II, was taken down to the natural clay (Fig. 15).

The earliest phase found in Trench II belongs to the medieval period and consisted of a layer of grey-brown clay above natural. Four pits were found cut into the natural clay (Fig. 15, Pits 6, 7, 8 and 9), and these and the one found in Trench I may, as suggested by David Devenish, have been dug to obtain clay. The fills of the pits, however, contained pot sherds, bone, and a few metal objects. The pits yielded similar groupings of pottery and a study of these should prove interesting, since little is known about the medieval pottery of the region. The groups consist chiefly of coarse grey and red wares and finer wares with green glazing. The pottery found is of a type believed to be centred on the 14th century.

Posthole 2 (Fig. 15) was found cut into the natural, but was not observed at a higher level. Posthole 1 had its large, flat base stone resting on the natural. (The base stone and some of the packing stones are shown in Fig. 15.) Posthole 1 (and posthole 2?) is possibly connected with the medieval building found in 1974. Other possible traces of the building were limited to a few clay and charcoal layers which tie in with the floor levels found in 1974. The extent of the layers found in Trench II suggests that posthole 1 could mark the north-west corner of the building. All other traces of the building appear to have been robbed out. No other structures were found in the medieval layers over the rest of the trench.

During the late 18th century a rubbish pit (Fig. 15) was cut through the medieval layers and into the natural clay. During the late 18th or early 19th century, stone cottages were built on the site. Possibly the area was levelled at this stage. The back of a cottage found during 1974 was discovered in Trench II, and this was connected to a stone lined cess-pit, whose last fill appears to belong to the mid 19th century. After this period

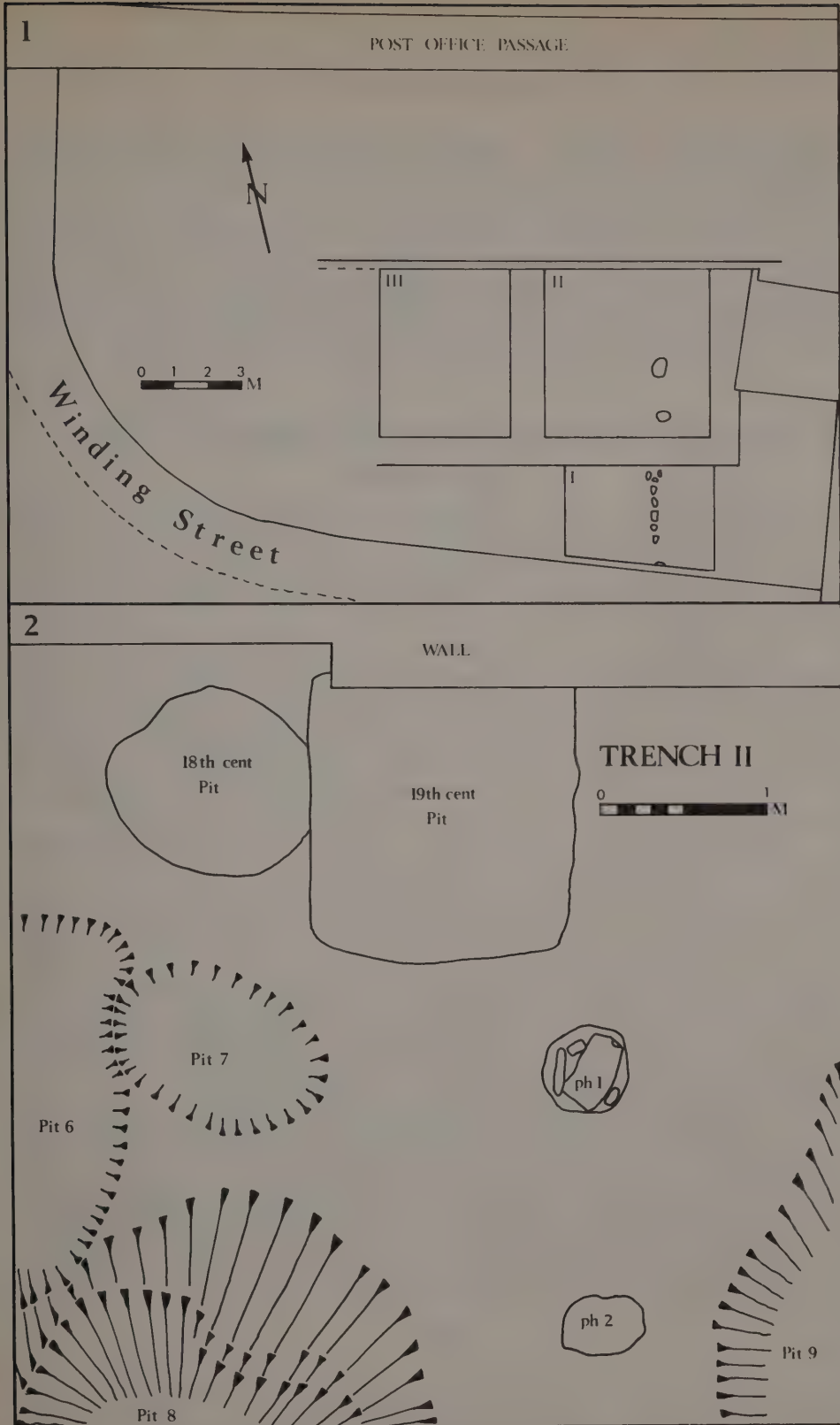


Fig. 15 Hastings 1975. (1) Location map of trenches in Winding Street. (2) Plan of medieval features in Trench II.

the pit was used as a soakaway. A cobbled area was found in the western part of Trench II and this seems to have acted as a passageway between the building found in Trenches I and II and that found in Trench III.

The cottage found in Trench III had a brick cross wall and to the south of this was a brick barrel-vaulted roof containing a circular hole. This structure, which was not excavated, is presumably a cellar roof. To the north of the cross wall were found two large rendered pits of unknown use. It was on account of the probable depth of the cellar and the depth of the two pits that Trench III was abandoned at this stage.

X. The excavation of a forge and fulling mill at Ardingly, West Sussex

by O. R. BEDWIN

In May 1974, the Sussex Archaeological Field Unit carried out a survey of about 250 acres to be affected by reservoir construction near the village of Ardingly, just north of Haywards Heath (Bedwin, 1975). As a result of the survey, it was decided to excavate a post-medieval, water powered site, which will be completely destroyed in the early stages of building the reservoir.

Historical references to the site indicate that it was originally a forge; there are 10 entries of 'hammermen' or 'workers at the hammer' in the Ardingly parish registers between 1568 and 1660 (Straker, 1931:408). Budgen's map of Sussex in 1724 shows the site as a fulling mill. There is no record of when the site went out of use, but it is unlikely to have been later than 1800. In the case of a forge, water power was used to operate a hammer and also bellows for the hearth; in the fulling process, water power is adapted to agitate woollen cloth in contact with an aqueous slurry of fuller's earth.

The site lay by a stream in the bottom of an unspoilt, heavily-wooded valley in the Weald. Geological maps indicate sandstone bedrock, and indeed, further up the valley, several sandstone outcrops are conspicuous. However, much of the soil encountered on site would be more accurately described as silt, i.e. a mixture of sand and clay with the former predominating. The main physical features of the site are shown in Fig. 16. The original bay (i.e. dam) still exists, and is used as a causeway across the bottom of the valley. There is no hammerpond. To the downstream side of the causeway was a reed-covered marsh; to the north and south of this marsh were grassy areas characterised by a soil much darker than that in the rest of the valley. The mole hills in these areas invariably contained small pieces of slag, and occasionally tile.

In spite of the clues, there was nothing above ground level by which the site could be more precisely defined, and after digging with little success on both sides of the marsh, the site was found to lie entirely beneath it. The marsh was therefore drained and cleared. Removal of reed-cover and about 50 cm. of marsh deposit revealed two almost parallel water channels perpendicular to the causeway (Figs. 16 and 17). The strip of land, about 10 m. wide, between these channels was the centre of industrial activity on the site.

ARDINGLY 1975

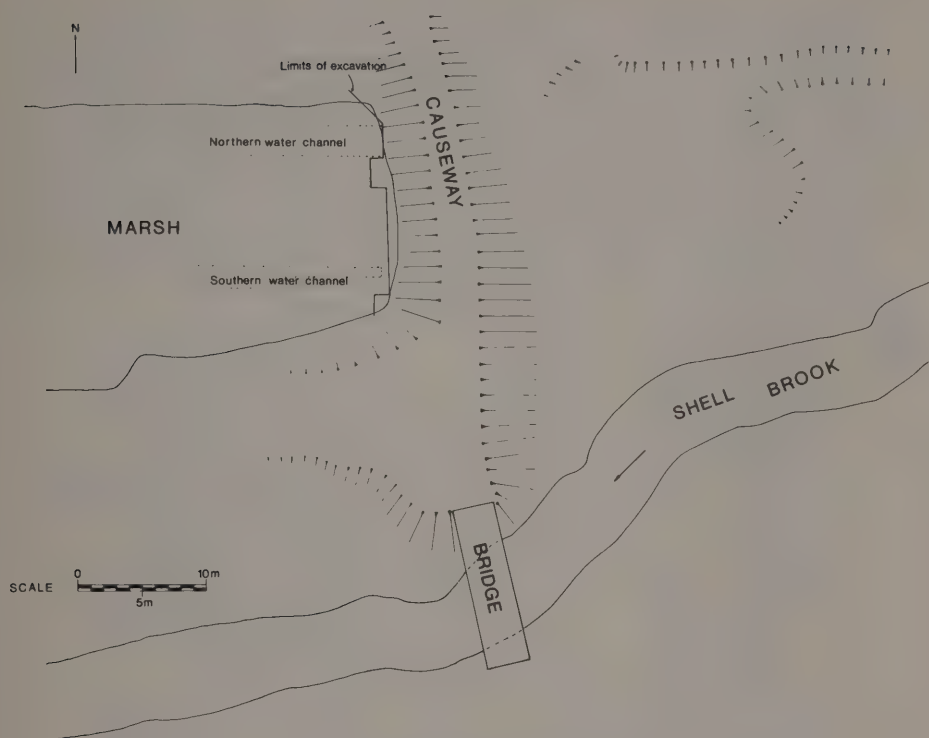


Fig. 16 Ardingly 1975. General site plan.

In the area between the two channels, two building phases were identified. The remains of the later phase, the fulling mill, consisted of a roughly T-shaped outline in sandstone blocks and bricks, with the stem of the T oriented north-south (Fig. 17). Only a single course of masonry survived, lying on a very hard surface, which seems to have been formed by the accumulation and aggregation of small bits of slag and other waste from the forging process. There were no foundations. Very little mortar was present in the thin layer of demolition debris, and it is likely that the building had only stub walls of masonry, with the rest, like many Wealden buildings still extant, consisting of horizontal wooden boarding. The roof was probably tiled; a few tile fragments were found in the demolition debris, and a great number in the northern water channel. No structures were found within the building. This is not unexpected as fulling was generally carried out in vats of wood or brick, which could have easily been dismantled.

ARDINGLY, WEST SUSSEX 1975

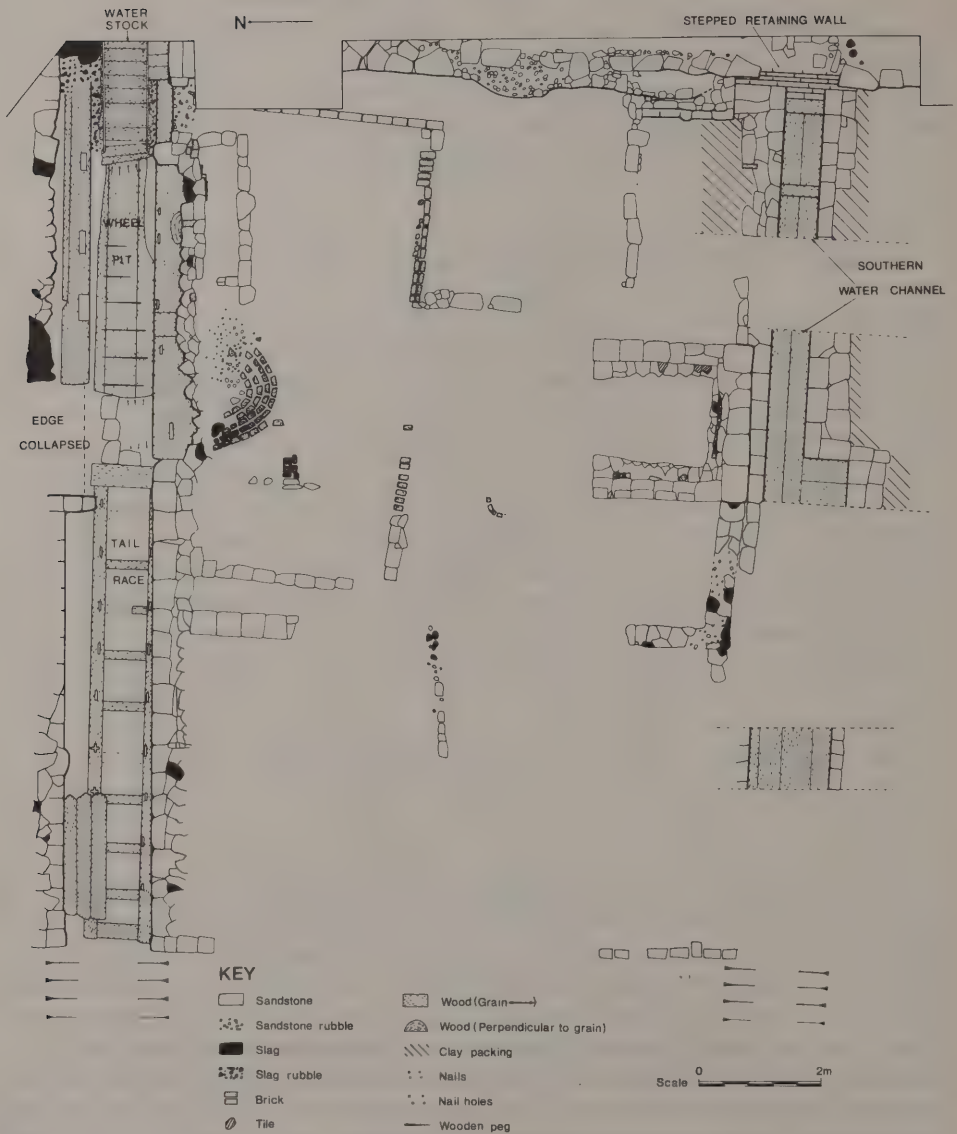


Fig. 17 Ardingly 1975. Plan of the fulling mill and the two water channels.

Removal of the sandstone blocks and bricks forming the top of the T, followed by trowelling of the surface beneath, revealed part of the earlier phase, the forge. This consisted of two large oak beams, perpendicular to one another, and an anvil base structure. The latter was made up of an oval iron cylinder with a solid base; the upper part was hollow and divided into a number of unequal segments (Fig. 18). This cylinder rested on a section of tree trunk up to 1.40 m. across and 1 m. deep set into a pit in the ground. The tree trunk was locked in position by three oak beams butted firmly against it (Fig. 18). The iron cylinder was surrounded by a very hard layer of hammer-scale, i.e. waste produced by the action of the hammer during forging. The position of the anvil base suggests that the hammer was driven by the wheel in the northern channel. Of forge hearths, there was little indication; two patches of dark red burnt clay were found near the

ARDINGLY 1975

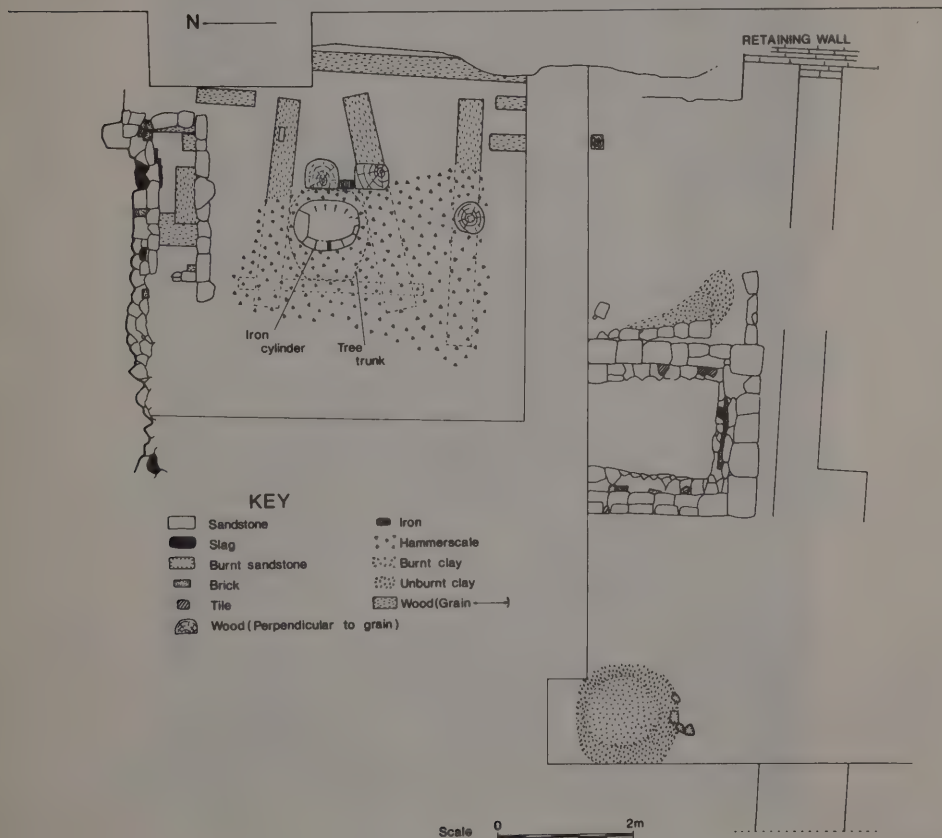


Fig. 18 Ardingly 1975. Plan of the remains of the forge.

southern water channel (Fig. 18); if these were indeed the remaining traces of hearths, then it is probable that bellows providing them with draught would have been operated by a wheel in this channel.

There were marked constructional differences between the two water channels. The northern channel, completely excavated, was rather clumsily built in places (Plate XII). The sides of the wheel-pit were made of large ash beams, except along the upper edges, where irregularly-worked sandstone blocks and lumps of slag had been used. The floor of the wheel-pit was made of oak; of the wheel itself there was no sign. By contrast, the floor of the tail-race consisted of two longitudinal oak beams connected by regularly



Plate XII Ardingly 1975. General view of the northern water channel from the west, looking towards the water stock. Scale 2 m. (Photo: O. R. Bedwin)



Plate XIII Ardingly 1975. The stepped retaining wall and head of the southern water channel. Scale 2 m. (Photo: O. R. Bedwin)

spaced cross pieces made of beech, giving a ladder-like appearance (Fig. 17 and Plate XII). Each of the surviving cross pieces contained several nail holes, strongly suggesting that the floor of the tail-race was originally covered with wooden planking. Furthermore, the fact that these longitudinal beams lay at a slight angle to the sides of the tail-race hints at two building phases. Initially, this tail-race might have been planked and was also perhaps narrower, its width being related to the distance between the two longitudinal beams. Later, the planking might have been removed and the tail-race widened to its final state (as excavated). Certainly, if planking was originally present, it must have been

taken up long before the fulling mill ceased to operate. Between the cross pieces of the tail-race was a hard, gritty fill containing many small metal objects associated with fulling and the handling of cloth, e.g. scissors, knives, pins, flat-irons, etc. The gritty fill was formed during industrial activity on site by the accumulation of fragments of sandstone worn away from the sides of the channel by the erosive action of running water. A similar layer was found at the bottom of the southern water channel, although the metal objects recovered from it were very different. At the head of the northern channel, the wooden water-stock was found intact, though two of its panels were slightly displaced (Fig. 17). It was made of oak and was situated vertically below a sandstone revetment built into the back of the bay. Its position indicates that it delivered water to an undershot wheel.

By comparison, the southern water channel was a far superior structure (Plate XIII). The floor of the channel consisted of elm planks, closely fitted together with no gaps (Fig. 17). The sides were vertical and were built of finely-finished rectangular sandstone blocks in regular rows. There was no sign of a water-stock. At the head of this channel, a massive, stepped sandstone retaining wall built into the base of the bay was uncovered. This retaining wall and the southern channel appeared to have been constructed as a unit. (No trace of a retaining wall was found at the head of the northern channel, even after complete removal of the water-stock.) In the southern channel, the only differentiation between wheel-pit and tail-race was a doubling in width of the channel (Fig. 17). The gritty fill at the bottom of this channel contained some quite large iron objects, e.g. a small hand-anvil, a defective cannonball, and some semi-fused masses of metal. Most of the objects could plausibly represent material brought to the site when it was a forge, for re-working. The upper fill of the two channels was also different. The southern channel contained a dark, homogenous, humic material, with occasional faint tip lines suggesting a deliberate backfilling. The northern channel contained mainly building rubble, particularly brickbats, tile fragments, and pieces of wood; the whole looked very much like unwanted demolition debris from the fulling mill. Above this debris was a soft, striated, light grey silt, resembling very closely material which would collect in a hollow in the ground. A simple interpretation of these observations is that the forge needed both channels (i.e. two water wheels), whereas the fulling mill required only one. The southern channel was therefore filled in. When filling came to an end, the mill was dismantled and unwanted debris thrown into the northern channel.

Not surprisingly for an industrial site, little pottery was found; the dating of the occupation of the site by the pottery is, however, compatible with the historical evidence mentioned earlier. References in the parish register to 'workers at the hammer' run from 1568 to 1660. The latter date would seem to have more significance for the cessation of forging than the former has for its beginning because the parish registers at Ardingly were begun *c.* 1550. Nevertheless, no pottery earlier than *c.* 1500 was found, and it seems therefore that the forge operated from the first half of the 16th century until *c.* 1660. The water power was then harnessed for fulling, which seems to have been in progress by 1700; three farthings dating from 1691, 1692 and *c.* 1700 were found in the same gritty layer at the bottom of the northern channel from which the implements associated with fulling

(described above) had come. Budgen's map shows the mill in 1724. Pottery from the demolition debris indicates that the site was abandoned c. 1800. Partial inward collapse of the northern side of the northern wheel-pit (Fig. 17) may have precipitated this. Since then, the site became completely obliterated by the formation of a marsh.

XI. A field survey of the parish of Alfriston, East Sussex

by P. L. DREWETT

In an attempt to put the excavation of the Neolithic oval mound (Drewett, 1975b) and the Bronze Age round barrow (O'Connor, above, section II) at Alfriston into their local archaeological and geographical contexts, a field survey was undertaken of the whole parish during the week of 14–19 December 1974 and for shorter periods during 1975 (Fig. 19).

The Parish of Alfriston covers some 4 square miles of land, the majority of which consists of chalk Downland. To the east of the Downland block is a long but narrow strip of lowlying alluvial flood plain between the foot of the Downs and the River Cuckmere. The majority of present day settlement, including the village of Alfriston, is situated on the foot of the Downs just above this strip. No concentrations of Palaeolithic or Mesolithic flintwork were located, although at least five Palaeolithic hand axes have been found in the Parish. All five are in Lewes Museum. Two were found at Hobbs Hawth and two at Pincham. The axe found to the west of the Parish church has recently been published (Holden and Roe, 1974: 4).

Two Neolithic barrows survive in the Parish. Long Burgh is a classic long barrow, being 55 m. long with two flanking ditches, while the oval barrow to the north was much smaller, being only 24 m. long. A Carbon 14 determination for an antler from the flanking ditch of the oval barrow gave a date of 2360 ± 110 bc (Drewett, 1975b: 151). A considerable quantity of Neolithic flintwork has been found on the Alfriston Downs in the past, but unfortunately much of it has no provenance. The Garraway-Rice Collection in Lewes Museum, for example, includes 8 polished flint axes, 154 other axes, 26 fabricators, 120 hollow scrapers, 79 end-scrapers, 70 side scrapers, 222 round scrapers and 20 arrowheads. Some of this material may have come from Hobbs Hawth (Fig. 19, G) where considerable quantities of flint work have been found in the past. The Curwen collection in Lewes Museum, for example, includes 17 leaf-shaped arrowheads and a polished stone axe from this area. This could well be the site of a Neolithic settlement, perhaps related to the long and oval barrows (Drewett, 1975b: 140). Scatters of Neolithic or Early Bronze Age flintwork recorded on the 6-inch maps in Lewes Museum (Fig. 19, F–I) were added to by the finding of three more scatters (Fig. 19, A–B, C and D–E) during the field survey.

There is little evidence for the occupation of Alfriston during the Early Bronze Age. No settlement sites have been located, although some of the flint scatters may be Early

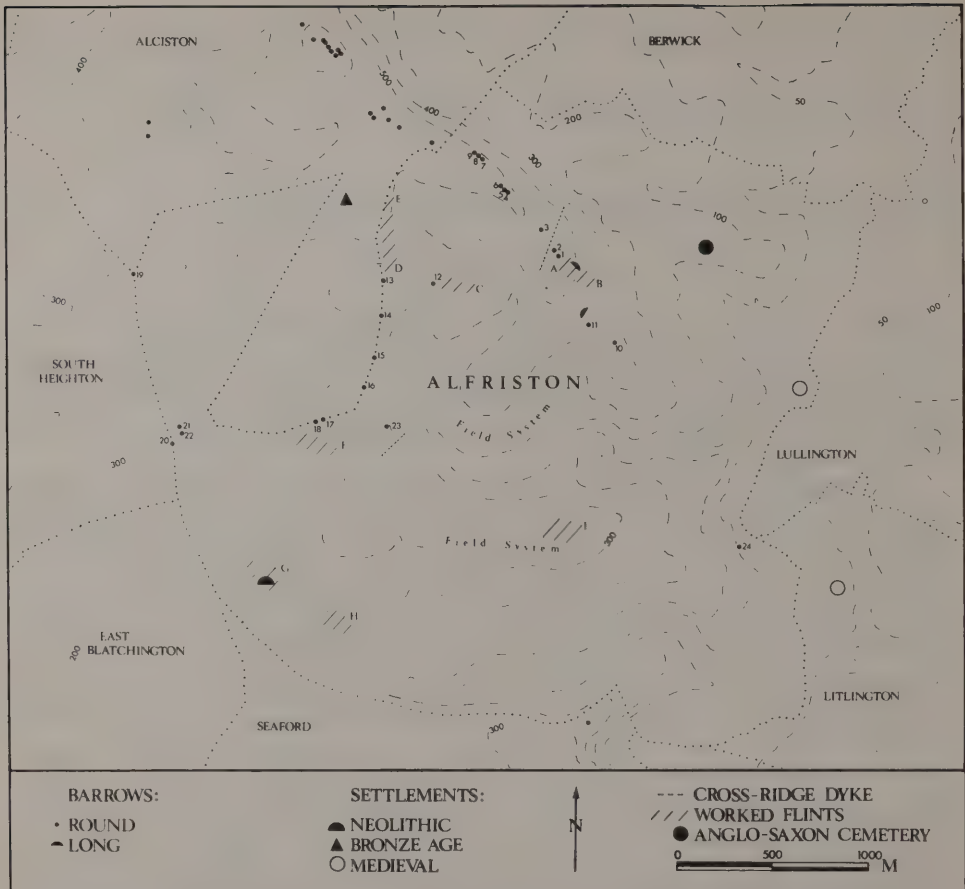


Fig. 19 Alfriston Parish Survey. Contours at 50 ft. intervals.

Bronze Age rather than Neolithic. Evidence from the ditches of the oval barrow excavated in 1974 suggest gradual silting under grass cover (Drewett, 1975b: 142). Twenty-four round barrows are known from the Parish (Fig. 19, 1–24). The majority are strung along the chalk ridges in dispersed linear cemeteries. Barrow 2 was excavated in 1975 (see Section II above). Whether or not the distribution of these barrows, together with the absence of settlements, can lead to the adoption of the pastoral economy hypothesis put forward for this period in Wessex (Fleming, 1971) remains an open question. The evidence from Alfriston Down would, however, not be inconsistent with the idea that Early Bronze Age economy was based on migratory pastoralism with few continuously occupied sites.

A large Middle Bronze Age settlement of the Itford Hill type is known from Blackpatch to the north-west of the Parish (Curwen, 1954: 193). This possibly indicates a reversion to mixed farming of the Itford Hill type. The existence of a Middle Bronze Age barrow, in which were found three urns similar to those from the Itford Hill barrow (Holden, 1972: 111), some 2 miles south-east of Blackpatch (Fig. 19, 24) would possibly suggest a further settlement of this period.

Evidence from both the ditch of the oval barrow (Drewett, 1975b: 126) and a section across the cross-ridge dyke between barrows 2 and 3 (Fig. 19) would suggest ploughing to the south of the dyke during the early pre-Roman Iron Age or perhaps even the Late Bronze Age. Ploughing the northern part of the Parish appears minimal, except perhaps in periods of maximum population pressure. Although we have excavated evidence for arable fields in the pre-Roman Iron Age and Romano-British periods, no lynchets survive in the northern part of the Parish. Field systems do, however, survive on the south facing slopes of the dry valleys in the south of the Parish (Fig. 19).

Although no pre-Roman Iron Age or Romano-British settlements have yet been found in the Parish the existence of field systems makes it most likely that some will be found. The two long, dry valleys with surviving fields are the most likely situations. In the Romano-British period this area of the Downs may well have been part of a villa estate, perhaps centred on a villa situated on the Greensand to the north. A probable villa is at Arlington, some 5 km. north-east of the Parish.

No further evidence for land use on Alfriston Down was found until the construction of the dew ponds for livestock and the digging of chalk pits, probably for marling the clay lands to the north-east. Evidence from the oval barrow ditches suggests open grassland from the 2nd century AD until the mid-1950s, when large areas of the Downs were ploughed up. The large Anglo-Saxon cemetery excavated in 1912 at the foot of the Downs (Fig. 19) perhaps indicates an as yet unlocated Pagan Saxon settlement. This could possibly underlie the Late Saxon *Aelfreds-tun*, which developed into the modern village of Alfriston.

XII. Preliminary observations on the use of flotation apparatus in Sussex

by D. WILLIAMS

Aims of the 1975 season

There were two aims of the flotation programme: to compare two flotation systems on a range of sites with different soils (Fig. 1), and to augment normal archaeological recovery techniques with a view to exploring the potential of different sites to provide information bearing on questions of economy/subsistence and environment. The pieces of apparatus 'on test' were a Cambridge Froth Flotation Cell (Jarman, Legge and Charles, 1972), purchased through the University of London Central Research Fund and loaned by Dr J. G. Nandris, and a Siraf type unit (Williams, 1973), which belongs to S.A.F.U. (Plate XIV).

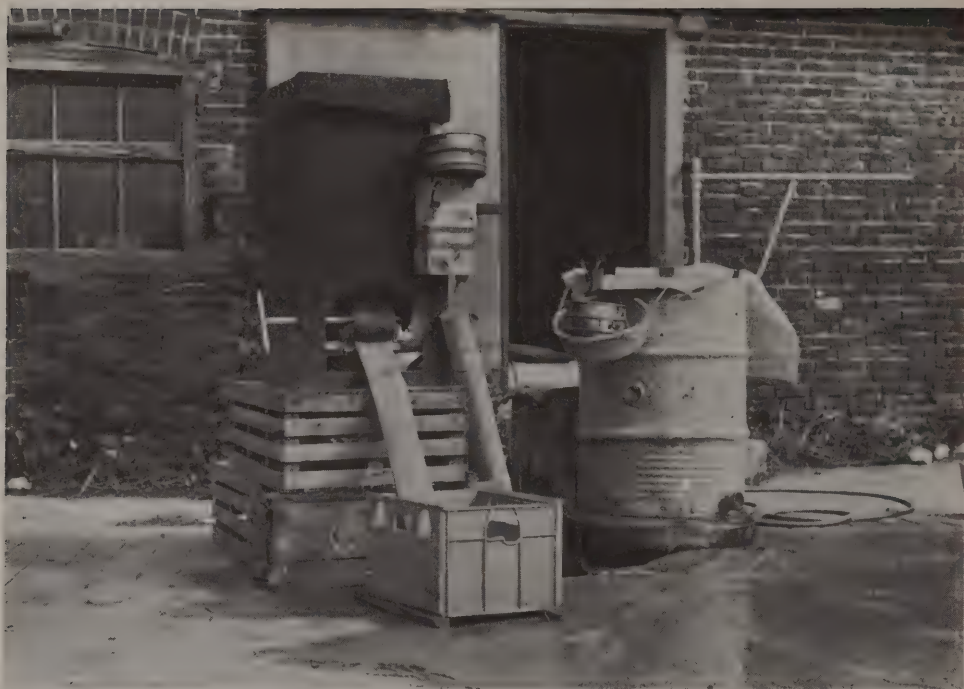


Plate XIV Flotation in Sussex 1975. The apparatus set up at Woodhorn Farm, Oving. Cambridge cell on left; Siraf unit on right. (*Photo: D. Williams*)

Methods

Samples were taken in consultation with the directors of the various excavations in line with the aims outlined above. In many cases samples were split, part being processed by each of the two systems. A record has been kept of quantities processed and time taken, and in addition comprehensive field notes were made. Throughout the summer two bronze granulometry test sieves were used on each machine to catch the floating (carbonised) material ('flot'). These were normally $1,000\ \mu$ and $300\ \mu$ on the Siraf unit and $1,000\ \mu$ and $250\ \mu$ on the Cambridge cell. At the time of writing most of the 'flots' have now dried in their paper towelling and await sorting. The heavy (non-floating) fraction was divided into coarse and fine: the latter being disposed of on site without sorting. The coarse fraction ($>1\ \text{mm}^2$ for the Siraf type unit and $>3\ \text{mm}^2$ for the Cambridge cell) was retained. Some tens of kilos of 'residue' require sorting for archaeological materials.

Work done and brief discussion for each site

The field season lasted from 10 July to 27 September, spending between 1 and 3 weeks at the following places: Elsted, Lewes, Bognor, Hastings, Alfriston, Bishopstone.

The assessment of samples processed is laid out in Table 2. Details of location and layout of equipment at each site are included to show the many ways in which flotation apparatus may be set up under different conditions.

On all sites residues were generally cleaner from the Siraf unit than the Cambridge cell, mainly because the mechanical agitation involved in the former seems to break up clay aggregations more effectively than cleaning froth-floated residues in the converted milk-crate which served as residue sieve, even though the mesh size of this is 3 mm² (as opposed to 1 mm² in the Siraf unit). It remains to be seen how much the dirtiness of the residues affects the sorting speed. Where the finds are few this is unlikely to slow the sorting much, but for some samples, e.g. from Lewis 1975 North Street A and the Neolithic pit 357 at Bishopstone, where large quantities of fishbone and shell remain to be sorted out; if everything is coated with clay particles the sorting may be very slow indeed.

TABLE 2. *Analysis of Flotation Samples Processed, by Site and Equipment*

	<i>Siraf Unit</i>		<i>Cambridge Cell</i>		<i>Total for Site</i>	
	<i>Buckets</i>	<i>Samples</i>	<i>Buckets</i>	<i>Samples</i>	<i>Buckets</i>	<i>Samples</i>
Elsted	20	11	12	9	32	20
Lewes, 75 North St. A	20	6	16	4	36	10
Lewes, 75 North St. B	7	10	4	4	11	14
Bognor: Hazel Road	61	13	4	2	65	15
Bognor: A29/A259	10	5	7	4	17	9
Hastings, Winding St.	13	8	2	2	15	10
Alfriston II	12	5	7	3	19	8
Bishopstone	45	16	13	9	58	25
TOTALS	188	74	65	37	253	111

Elsted: The flotation apparatus was set up on the south side of the Greensand Way with excess water, mud, etc. draining into this, which is a hollow way at this point. Water was brought from a nearby field supply, usually used for cattle troughs. The apparatus was some 300 m. from the site; samples were brought to the machinery in fertiliser sacks in wheelbarrows. The soil was consistently heavy and very difficult to break up – both in the presieving required for the Cambridge cell (Jarman, Legge and Charles, 1972: 44) and in the agitation and breaking up process in the Siraf unit. The samples, which had all been trowelled, were often very dry, this adding to the difficulties. Overnight soaking, which made the clay less difficult to work with, appeared to affect the recovery rate for charcoal adversely. Those samples soaked prior to processing in the Cambridge cell were introduced as a slurry. There were only small quantities of charcoal present in most of the samples.

Lewes: The machinery was set up on the site, draining into a sump constructed in rubble cellar fill, as the best drained area on the site. Water was brought from an outside lavatory on adjoining premises (a Baptist chapel). Samples were taken from pits and

produced variable, but often large, quantities of charcoal. The rate of recovery was not always high; those samples which were drier floated better. Presieving for the Cambridge cell was often laborious because of the stickiness of the deposits.

Bognor: Because of the intermittent supply and the low pressure of the water available on site, the apparatus was set up in a disused cattle yard at Woodhorn Farm, Oving, some 8 km. from the site (Plate XIV). The material to be sieved was stored in fertiliser sacks and transported by small van from site to the farm. Water came from the farm mains supply. Samples were processed from the Hazel Road site and also from the Roman site exposed by roadworks and explored at the A29/A259 junction. On both sites soils proved so dry that they often had to be broken up with a hammer, as a necessary preliminary to normal processing. The hammering appears to have had little adverse effect on the quantity of charcoal being recovered.

Hazel Road site: Flotation of the Iron Age ditch was mainly by the Siraf unit. The soil was an extremely hard brickearth, producing a minimal amount of residue. Flots were often as much fine soil particles as charcoal; however, the charcoal recovery rate seemed high because of the dryness of the soil. The residues will be very easy to sort because of the low bulk.

A29/A259 site: The soils were mainly dark and fairly clayey, and often very hard. The small amounts of charcoal recovered hardly seemed to justify the labour of some of the samples. A piece of willow pattern plate in one sample is a timely reminder that deposits must be securely stratified *and* accurately excavated to make the extra work of flotation worthwhile. Residues were small, but as most of the samples were excavated with a pickaxe any amount of finds are expected.

Winding Street, Hastings: In addition to the main aims of the work, at Hastings a particular point was made of familiarising Hastings Area Archaeological Research Group members with the aims and methods of flotation. Many of the samples were done, therefore, as demonstrations. The samples came from a range of contexts, including post-medieval pits and also a clay sample thought to be natural: the presence of charcoal in the flot sieve indicated that this was not so. The apparatus was set up on the spoil heap, water draining away beneath it into the drainage system of the 19th century laundry that had occupied this part of the site. Water was provided from a mains standpipe. The standpipe was hired from the Southern Water Board and took a couple of hours to secure: a deposit of £50 was charged, from which £1 per week rental was deducted. There was a hydrant just outside the excavation boundary fence, so that the fence was simply extended to include the hydrant for safety reasons. The flow/pressure was the best of any of the supplies used.

Alfriston: The equipment was set up in a field on the edge of the South Downs Way near a farm water main approximately 400 m. west of the site. Excess water ran to waste across the field. Samples were carried by van from the site. The major drawback with the location was the exposure to high winds, which put a stop to froth flotation because of

the froth blowing away. The van (Morris Minor 6 cwt) was only partly successful as a windbreak. The soil was generally easy to sieve as there were many chalk and flint lumps which could be readily discarded; however, various of the samples did not break up readily. The soil in one sample actually floated, causing sieve clogging and other headaches. Residues were fairly small, with finds likely to be only shells and unfloated charcoal. Most of the flots contained more shell than charcoal.

Bishopstone: The flotation was done just behind one of the gardens backing on to the site, the water coming from an outside tap in the garden. Samples processed included the contents of two Neolithic pits and samples from the Iron Age enclosure ditch. A number of the samples had already been dry-sieved to 10 mm² in the trench and the archaeological materials removed from them. Flots were very variable in size, but some certainly contain appreciable quantities of carbonised grains. In the case of the Neolithic pit, the carbonised grains noted in the flots is the only indication that the pit had been used by farmers, who were also 'strandloopers', as the quantity of shell indicates. A number of samples were treated with hydrogen peroxide to break up the crumb structure of the soil, but it is too early to say exactly what effect this had. Some of the residue, e.g. from the Neolithic pits, has a large quantity of shell which is going to prove slow to sort, but of great interest regarding subsistence.

Work in hand

Flots: these need cleaning from their paper towelling and sorting initially to separate charcoal and mollusca from soil particles and modern material blown in during excavation/flotation before the real job of charcoal/seed sorting and identification can begin.

Residues: these are to be sorted for archaeological material.

Soil samples: these were taken from each layer sieved and will be subjected to particle size analysis and pH measurement. It will then be possible to see how these have influenced both speed of flotation and the rate of charcoal recovery.

Initial observations on the performance of the machines

Water separation (Siraf type) machine: A number of improvements suggested themselves during the season and were adopted. These include the use of a tyre as a base; this stops the tank sinking into the ground and, by keeping the base of the tank out of the earth, cuts down rusting; the drum is at a better working height too. The supports for the 2 cm. grid beneath the residue net described in the original design (Williams, 1973: 288 and Fig. 1, b and c) have now been replaced by three simpler supports made of reinforcing rod (Fig. 20a). The lower end is turned down slightly to prevent its damaging the residue net. The supports are placed near either end of the weir and directly above the inlet pipe. A net clip for the weir was devised. A 2 cm. wide strip of zinc sheeting is bent so that its ends slip over the weir sides and the central flat part lies on the weir itself, trapping the leading edge of the residue net. The central cowl has been replaced; instead, the appropriate diameter of screwed bung is threaded into the upturned end of the inlet

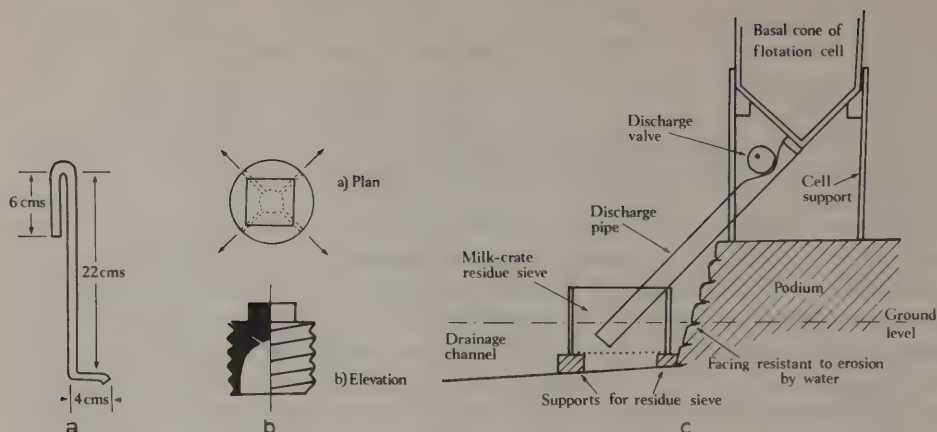


Fig. 20 Flotation in Sussex 1975. (a) Redesigned grid support for Siraf unit. 8 mm. reinforcing rod. (b) Cowl replacement for Siraf unit. Threaded bung with four perforations to distribute inflowing water. (c) Froth flotation cell: elevation of arrangement when using a residue sieve.

pipe. The bung is provided with four holes as shown in Fig. 20b. Aperture size is controlled by how tightly the bung is screwed in. In practice, a larger number of smaller holes may improve pressure and cut down turbulence.

Areas where improvements are warranted are in the width of the weir entry, for strong side winds and countercurrents may draw the flot away from the weir under the present arrangements. Residue mesh apertures are also under review (see next section).

Froth flotation cell: The operation of a froth flotation system should be much more efficient in terms of labour inputs than is possible with the Cambridge unit. The following are examples of inefficient apparatus design:

(i) The effective capacity of the cell, that is the volume between the base and the bubbler unit, is only $1\frac{1}{2}$ buckets, compared with the Siraf unit which holds 14–16 buckets.

(ii) Cleaning out of the mud is laborious because the soil sticks to the sides and has to be agitated with a pole; in theory (Jarman, Legge and Charles, 1972: 42) the 'conical' base of the cell was designed with a sufficiently steep slope for rapid mud removal. On the contrary, the taper of the cell has little advantage for this, but it is the reason for the small capacity noted above.

(iii) The red discharge pipe has to be 'milked' to keep the soil moving because of its length and small diameter: the mud never flows out by gravity alone.

(iv) The milk-crate (residue sieve) has to be much lower than the base of the cell to allow the mud to flow — at least 45° slope in the discharge pipe is required for efficient operation (Fig. 20c and Plate XIV). In the field, therefore, it proved best to put the cell on a podium, which entailed more loss of efficiency as the operator had to clamber up and down continually.

(v) Anything from 20%–70% of the floating material does not actually flow in the froth over the weir, and has to be induced to do so after the bubbler unit has been removed, by filling the cell with water and allowing this to flow over the weir while the operator helps charcoal, mollusca, etc. towards the weir.

(vi) Some of the charcoal which has sunk (and which would otherwise pass through the 3 mm² residue sieve) does float during emptying out of the mud, because agitation with the pole releases it from the soil matrix and it then comes up to the surface. Before beginning a new sample, therefore, all this material has to be made to flow over the weir, out of the cell, and into the seed sieves, otherwise it will contaminate the next sample.

Projects stemming from the summer's fieldwork

Aperture size of residue mesh in Siraf unit: Because of difficulties in breaking up clay and humus rich deposits and securing clean residues, the standard of a 1 mm² mesh (French, 1971:61) is questioned. Two sets of experiments are to be carried out to explore the possibilities of increasing the aperture size of the mesh. Firstly, residues from Sussex will be graded, weighed and sorted, the sorting times noted, and the range of archaeological materials found in each grade recorded. Secondly, experiments in the field are to be carried out to compare how much more quickly the fines will pass through various larger aperture meshes, comparing increased speed of operation with loss in archaeological materials (from much reduced bulk of residue, that is). It is hoped that a rule-of-thumb law of diminishing returns can then be operated when selecting residue net aperture size for each site, depending on the local soil conditions and sample requirements.

Flot sieves: Designs are at the drawing board stage for 'home-made' flot sieves as high resolution commercially manufactured sieves are upwards of £5 a time. It is intended to make it possible to have detachable meshes which will facilitate cleaning out the flot, as well as allowing ready interchangeability of aperture size.

A new design for froth flotation: Plans are well advanced for building an improved Siraf unit which it will be possible to operate either as a froth flotation unit or as a simple water separation device. Improvements envisaged will cope with the following problems encountered in Sussex:

- (i) The labour of pre-sieving samples for froth flotation.
- (ii) The small capacity of the Cambridge cell (see above).
- (iii) Weir inefficiencies in the Siraf unit (see above).

Other points considered are the expense (£400+) of the Cambridge system, which puts it well out of the range of amateur as well as many professional excavation groups. Previously the only expense in building a Siraf unit has been the use of welding equipment, but with the cost of this increasing rapidly, alternative techniques for removing oil drum lids and sealing inlet pipes and the mud outlet are being considered. If it does prove possible to construct such a unit using only handyman's tools and skills, then flotation will become more accessible to excavators.

Such a dual-purpose machine will also be a useful piece of test equipment in evaluating the supposed superiority of recovery rate of froth flotation over simple water separation.

Acknowledgements

I should like to thank all the directors of the sites where I worked, together with Peter Drewett, for their interest and encouragement. For water supply, I am indebted to Manor Farms Ltd, Elsted; the Evangelical Baptist Chapel, Little East Street, Lewes; Mr Roger Pitts, Woodhorn Farm, Oving, North Bersted; Mr John Lewis (Alfriston). My particular gratitude is due to Dr John Nandris (Institute of Archaeology) and the Central Research Fund of the University of London, for without the loan of the froth flotation cell so much of the summer's experimental work would have been impossible.

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The problem of the *Belgae* seen from the Continent*

by R. HACHMANN

I

The first time British archaeology was confronted with the problem of the *Belgae*, was when in 1886 Sir Arthur Evans excavated the Aylesford cemetery. Publishing the finds in 1890 he was brought up against this question and he outlined his ideas of a possible solution (Evans, 1890: 317–88). The discovery of the cemetery of Swarling in 1921 and its publication in 1925 by J. B. Bushe-Fox (1925: 1–55) was an important advance. Aylesford showed archaeological material to be Belgic, but Aylesford and Swarling and some more finds seemed to point to a cultural group which must be Belgic. Thus Christopher Hawkes and Gerald Dunning in 1931 had a sufficient foundation to deal with the whole problem of the *Belgae* in Gaul and Britain (Hawkes and Dunning, 1931: 150–335). Their treatise widened the horizon of all future research and paved the way for the next 30 years of study. It was also the first attempt to use continental material in studying this problem in Britain. Yet the continent at first hardly took notice of these studies.

A totally new approach has arisen with Derek Allen's numismatic studies since 1944. For a time the problem appeared to be brought near to a definite solution, which seemed to reveal a surprising amount of historical detail. But in reality his arguments are highly speculative and have no good foundation (Allen, 1944: 1–46; 1961, 97–308).

At the end of the 1950s continental archaeology became active, and Marc-Édouard Mariën in particular advanced the problem by a number of articles and books (Mariën, 1961; 1964; 1965).

In the early 1960s Frank R. Hodson reconsidered the system of chronology of the pre-Roman Iron Age in Britain (Hodson, 1964: 123–42), and in 1965 Ann Birchall once more reconsidered the current state of knowledge (Birchall, 1965: 241–367).

In 1968 Hawkes had interesting new thoughts on the *Belgae* (Hawkes, 1968: 6–16) and in 1971 the state of research for present-day Belgium was summarised by Mariën (Mariën, 1971: 213–41). Most recently Barry Cunliffe has given a comprehensive picture of the British scene in 1974 (Cunliffe, 1974).

* This lecture was delivered as one of the Special University Lectures in Archaeology on 21 May 1975 at the Institute of Archaeology.

But in spite of all progress on details the problem did not become much clearer and up to date there is no convincing solution. That is why I shall try to make a *résumé* of it. Of course I do not hope to be able to find the complete solution. But living on the continent I see the problem in a different perspective and I may be able to draw attention to some new aspects of it.

It is remarkable that up to now French archaeology has taken little interest in the problem of the *Belgae*. Everything there would have remained as it was if Sir Mortimer Wheeler and his collaborators had not made excavations on hill-forts in Northern France (Wheeler and Richardson, 1957). But strictly speaking the state of investigations into the problem of the *Belgae* has remained the same in Northern France since 1914, when Joseph Déchelette gave a brief account of it (Déchelette, 1914: 566, 610–11).

Up to now German research has seen little reason to study the *Belgae* and their history. This may be attributed to the unsatisfactory state of research in Northern France and the scattered publications of the very poor and mostly carelessly excavated finds, which represent one of the main obstacles, if not the most important one. First of all I want to emphasise the fact that I myself can contribute little or nothing to the facts concerning the archaeology of the *Belgae*, especially those with respect to this country. No new, still unpublished find, which could contribute important facts, has come to my knowledge, either from France, or from present-day Belgium, or from this country.

What then is the reason for me nevertheless to engage in this problem? This can easily be explained: the problem of the *Belgae* for archaeology originates not so much in the archaeological sources themselves, but rather in the interpretation of the literary sources. What classical authors wrote about this topic represents the fundamental or, let me put it better, the immediate reason for archaeology to take an interest in it. If certain classical manuscripts had not survived the Dark Ages, we would not have any problem of the *Belgae*.

If allusion is to be made here to classical authors, then of course Caesar must be the first to be mentioned. Indeed, it is he who played the most important rôle in the war against the Belgic tribes and whose information plays the main part for us today. It is he who was the first to see the *Belgae* from the continent, as I shall try to do. It is therefore desirable — even necessary — for us to see them at first the same way that he did.

The first of all the questions now to be raised and discussed is the following: what information had Caesar, and other Greeks and Romans about the *Belgae*? Secondly it must be asked: how did they interpret their own knowledge, and did they — as a consequence — misjudge the whole situation? Thirdly, how are we to assess what classical antiquity knew? The main difficulty then is, in other words, to extract the historical truth from classical reports, or to express it more exactly — to find the truth behind what we read in these reports. After this is done — and only afterwards — the archaeological evidence may be allowed a hearing.

My intention is to clear the ground by insisting that the problems have to be dealt with in a certain chronological order. Put differently: the problem of the *Belgae* must be regarded as a methodological one.

One point must be considered above all: the veracity of classical sources has to be found in them and only in them. In this connection archaeological findings do not at first provide any suitable arguments. Therefore they must be completely set aside at the beginning. As an archaeologist I thus find myself in the unusual position of having to deal with questions which lie mainly beyond the scope of my field. Nevertheless, the complex of questions is defined by what my field is able to achieve in science. I therefore cannot take for granted what philologists and historians say about the *Belgae*. They tend to put different questions. As an archaeologist I have questions of my own, and I have to answer these questions myself.

I am strictly against every 'mixed argument', as I call it. It is unfortunately true that arguments of this kind have a long history and are still widely used today. Solving a specifically archaeological problem by reasoning directly from a literary source is never a correct procedure. Such an answer is often clearly illusory. Conversely, a problem posed specifically by literary sources can have no satisfactory solution through arguments based exclusively on archaeological material. Again the result is often merely self-delusion. As a rule any purely archaeological argument is of no real use in connection with problems posed by literary sources and *vice versa*. The correct methodological approach is not to mix archaeological and philological arguments.

On the basis of these principles I hope to be able to offer some original views on a well-known problem, basing myself upon well-known sources. I must repeat that, since no new sources are available, I am mainly dealing with methods, among which some may be new.

Because of the nature of the sources and because of the character of my considerations this article consists logically of four parts, which have to be treated separately. The first part is a kind of introduction. The second part dealing with the literary sources and the historical reports is necessarily the longest. The third part treating the archaeological sources and what they mean is shorter because of the relatively smaller number of sources. But in future these will surely increase, while the philological sources are almost certainly exhausted. Only after all this can we finally try to combine the second and third parts by comparing the results.

II

As is well known, it is Caesar to whom we owe the main source for the history of the *Belgae*. Who was Caesar? Of course we know him very well as a writer and as a politician and we believe we know him too as a historian. But was he really a historian in the modern sense of the word? Did he write a history of the Gaulish war in a modern way? Caesar was an educated man, who knew the world as well as possible at that time. He knew a lot of the results of the science of his day, but he was no scientist. The reports which he sent to Rome during his eight year expedition in Gaul were in the first place intended to make his actions understood by the Roman Senate and by the educated

classes in Rome who shared the leadership of the state. On the other hand they were also intended to prepare the part he wanted to play in Roman politics at a future date.

Surely, the main task of his reports was not to give an account of the events in Gaul as they actually happened, and to explain their background in accordance with the facts. He wanted to make clear to a cultured circle of readers taking a direct interest in political events his own opinion of what happened in Gaul and why it happened in such a way. He deliberately selected what he reported and cautiously considered how to tell it. His reports therefore do not match historical truth in every detail. The truth is, so to speak, often hidden behind his words. It is in these that we have to trace it.

Caesar was not the first to give details about the country and its inhabitants, but he was the first to leave a complete report to us. The historian, geographer and philosopher Posidonius wrote a lifetime before him. In his historical and geographical papers he also dealt with Gaul and its inhabitants. His books are lost, but we find comprehensive extracts from them in the works of Athenaius, Diodorus Siculus and Strabo (Tierney, 1960), which shows us that Caesar, too, knew his writings. It seems that it was on them that he based his account of the ethnography of Gaul and Germania. This is important for judging Caesar's reports. Before Posidonius, the historian Polybius had given shorter descriptions of Gaul and the inhabitants of the countries north of Italy, but the connections between Polybius and Posidonius are negligible.

Not all descriptions in Caesar's commentaries are founded on reliable reports of good informants or on his own observation. He is often repeating statements which he found in the works of acknowledged scholars, without having checked them over in his own mind, because he believed them to be useful for the purposes of his own presentation of facts. Of course, in Caesar's time it was not common practice to name every informant. That is why we have some difficulties today in finding out on whose statements he based his reports (Rambaud, 1953).

In trying to understand Caesar aright, still another point has to be considered: we generally proceed from the assumption that Caesar wrote his *Commentarii* after the end of the seventh year of war in the winter of 52/51, founding them on his annual reports for the Senate. But there is good evidence that his *Commentarii* were written down by him either annually or at the end of an important period of military activity.

As the war progressed, Caesar continually came to hear things that he did not previously know or could not know before. We consequently find contradictions between the different parts of the reports since these are separate reports of different sections of the war. Information given in later reports does not match conclusively with earlier ones. Caesar had to accept this, hoping that he could rely upon the forgetfulness or the carelessness of his readers and the persuasive power of his respective reports. In the records of the first and second years of war we can find a good example of such contradictions, which could not be eliminated by Caesar afterwards. During the first year he repeatedly wrote that the Rhine was the frontier between Celts and Germanic groups (B.G. I 1). However, after the second year of war he realised that even west of the Rhine there lived a rather large group called *Germani* (B.G. II 4).

When necessary, Caesar seems to have tried to mitigate contradictions by adding marginal notes in his own working copy in order to publish later on a new revised and complete edition (Barwick, 1938; 1952: 23–40; 1955: 41–72). Because of his sudden death he was not able to do so; but there is every reason to believe that afterwards a person whose name we do not know, but who must have been one of Caesar's confidants, published the complete works found in his bequest as the *Corpus Caesarianum*. This new edition contained the marginal notes as additions to the current text. Later on a copyist added several sentences. Thus we are quite sure that the ethnographic report which is placed just after his second British campaign (B.G. V 12–14) contains two chapters (B.G. V 12–13) conceived later on by Caesar or someone else (Goette, 1964: 304–36). It is just these chapters which touch among other things on the immigration of *Belgae* into Southern Britain. This was a fairly fundamental change of the text, but mostly such changes must have been minor ones.

As far as geographical and ethnographical knowledge is concerned, every part of the *Commentarii* reflects that state of information reached by Caesar just before he started to write that section. Besides his own observations and information other information is repeatedly added, mostly derived from the works of Posidonius, which he always seems to have carried in his pocket.

After the first year of war Caesar still had little knowledge of the *Belgae*: *Gallia est omnis divisa in partes tres, quarum unam incolunt Belgae, aliam Aquitani, tertiam qui ipsorum lingua Celtae, nostra Galli appellantur* (B.G. I 1). This sentence coincides in its details with that of Strabo (Strabo IV, 1, 1), who for his part did not depend upon Caesar but who had come across them somewhere else, probably also in the work of Posidonius. When writing this, Strabo could have found Caesar a welcome confirmatory witness, but it is not totally clear, in this case, whether he used Caesar's work or not.

Caesar himself already found the division of the Gaulish population set out in the literature. He adopted this pattern without hesitation because during the first year of war he could not get any idea of his own concerning the country and its inhabitants. The division into *Belgae*, *Aquitani* and *Galli* was probably made by Posidonius, and it might already have been the latter who regarded the Seine and the Marne as the southern and the Rhine as the eastern border of the country of the *Belgae*. It had been an old Greek tradition to take rivers as boundaries between countries and population groups (Scheliha, 1931). Caesar adopted it as a matter of course.

We usually stress the division of the Gaulish population by language which Caesar put out, but without any doubt Caesar's authority Posidonius, like Caesar himself, did not have at his disposal any objective criteria to judge the distribution of languages in Gaul: in reality neither Posidonius nor Caesar worried much about the language, unless certain questions of rhetoric and style in their own language were involved. Foreign languages never stirred the attention of the philologist of classical antiquity (Pfeiffer, 1970: 321–35). Where differences in language were not evident, often very superficial and shallow criteria were used.

As to using the way of life as a principle of classification, Caesar delivers a summary

judgement: in this respect the *Belgae* had little in common with the rest of Gaul, especially with the southern part of the country which had already been a Roman province for about 60 years. However, in his opinion they were living in *civitates* just like the rest of the Gaulish population and as a rule not in *gentes* or *nationes* like most of the Germanic groups; therefore they were not ranked with the latter who were often called *barbari*. But their way of life had little to do with the *humanitas* of the Roman province. They had little contact with merchants and did not import luxuries (B.G. I 1). In the opinion of Greek and Roman ethnographers they showed characteristics typical of uncultured peoples.

The *Nervii* were thought to be even more uncultivated than the majority of the *Belgae* enumerated in B.G. II 4. They were classified as a *gens* (B.G. II 28) and they were designated as *homines feri* (B.G. II 15), a classification mostly combined with the term *barbari*. According to the report of the fourth year of war, the *Morini* were also regarded as *barbari* (B.G. IV 22). Caesar clung, as can be seen, to tradition in a totally formal way.

It can easily be realised that criteria of this kind are of no objective value, or at least of very little value. Without exception they are due to the formal method of classical ethnography. But sometimes we can touch a bit of historical reality behind the thinking and behind the words.

What sort of people, then, were those *Belgae*? . . . This question grows more urgent the more evidence we find that the substantive value of Caesar's statements is small and of little use. Caesar uses the word *Belgae* without any further attribute, whereas at least once he speaks of the *nationes* of the *Galli* and the *Germani* (B.G. VI 11) and at another time of the *natio* of the *Galli* (B.G. VI 16). If we would now conclude, in spite of this analogy, that the *Belgae*, too, were a *natio*, we would gain little, for the semantic value of this word varies and in general large populations are not called *nationes* by Caesar. After all it may be recognised that for him *Galli*, *Germani*, *Aquitani* and *Belgae* were notions of almost the same value.

At the very beginning of his first book, Caesar points out that the term *Celtae* was what these people called themselves (B.G. I). It may be supposed that the name *Germani* was used the same way, even though only for the small group of the *Germani cisrhenani* (B.G. II 3, VI 2; 32). Caesar generally took the word *Germani* in a double sense, either as a group of population west of the Rhine whose existence was reported by the *Remi*, or the whole population east of the Rhine. The major part of the *Germani* living east of the Rhine is notorious for never having called itself by this name (Norden, 1920: 423–8). They were given the name by Caesar. Is it true then that the name *Belgae* was what the North Gaulish people called themselves?

In his second book Caesar listed the *civitates* which in his opinion were Belgic (B.G. II 4): the *Ambiani*, the *Atrebatas*, the *Bellovaci*, the *Caletes*, the *Menapii*, the *Morini*, the *Nervii*, the *Remi*, the *Suessiones*, the *Veliocasses* and the *Viromandui*, 11 groups altogether. But he also includes the *Atuatuci*, who according to Caesar's own statement are believed to descend from the *Cimbri* and *Teutones* (B.G. II 29), and the *Germani cisrhenani*, too, are numbered among the *Belgae* in his second book. Accordingly, the *Eburones*, *Caerosi*, *Condrusi*, *Paemani*, and *Segni* (B.G. VI 32) must have belonged

to the same group as well. We find this list of names in a report of a Remic quisling. This report seems to be both a list of Belgic groups of population and a list of groups who formed a league against Caesar.

After the second year of war Caesar might have intended to emphasise the danger of the *Belgae*, then newly vanquished. This appears to be the main purpose of the vast catalogue counting 16 or 17 groups of population. In trying to divide this list into Belgic and non-Belgic groups Strabo's extracts from the work of Posidonius are of no value, for there we find statements of different origin inextricably mixed up with a list of peoples inhabiting the much larger *Provincia Belgica* created by Augustus (Strabo IV 2, 5).

In any case the possibility must be considered that only a part of those groups named *Belgae* by Caesar gave themselves this name. Indeed, this is very probable. Christopher Hawkes was certainly the first to take it into consideration (Hawkes and Dunning, 1931: 241). My own arguments differed slightly from his (Hachmann, Kossack and Kuhn, 1962: 46–8) and later Hawkes agreed with these (Hawkes, 1968: 8–9). Now I should summarise my arguments concerning this problem, discussing some more details.

After his second British campaign Caesar could not take up winter-quarters with his legions in one place, because in that year a bad corn harvest could have resulted in a shortage of provisions (B.G. V 24). He therefore stationed one legion in the territory of the *Morini*, a second one in that of the *Nervii*, a third one in that of the Gaulish *Esuvii*, the fourth in the district of the *Remi*, the fifth in that of the Germanic *Eburones*. Another three were stationed in *Belgium*. '*Tres in Belgio collocavit*', he said.

Soon afterwards difficulties arose with the Gaulish *Carnutes* living south of the Seine and Caesar hurried to send one of the three legions from *Belgium* to the trouble-spot (B.G. V 25). Some time later he had to give marching orders for the second of these three legions, which was quartered in the region of the *Bellovaci* (B.G. V 46), and sent it to the north where the revolting *Nervii* were threatening the legion wintering there. At the same time he ordered the legion sent to the *Morini* to turn to the south to the country of the *Atrebates*. Caesar himself was in Samarobriua in the country of the *Ambiani* and together with him must have been the third of the legions he had quartered in *Belgium*. The first of the three legions, the one he had sent to the *Carnutes* originally, might as well have been quartered on the *Bellovaci*, for this was the most powerful and dangerous group which stayed restless until the end and made difficulties for Caesar even during the eighth year of war.

Caesar's detailed description shows that the name *Belgium* applies to a region which included by no means all the peoples which Caesar had listed as Belgic after the second year of war. The problems connected with the name *Belgium* have long been studied by classical philologists. Different solutions have been offered to eliminate the contradiction existing between the small country *Belgium* and the great number of Belgic peoples. Various expedients have been tried to eliminate this irksome word, and so to get rid of the whole problem. But neither a mistake in writing nor an intentional change of two mentions of the name of a Belgic population group into the word *Belgium* is possible and both can be left out of account (Barwick, 1955: 41–51).

Proceeding from the use of the word *Belgium* in the fifth book of the *Commentarii* it must be concluded that the *Morini* and of course the *Menapii*, the *Nervii*, the *Atuatuci* and the *Remi* are not inhabitants of this *Belgium*. In this context Caesar does not mention the *Suessiones*: seemingly they had already been *clientes* of the *Remi* (B.G. VIII 6) since the second year of war. It is left in abeyance whether they settled in *Belgium* or not. Myself, I think they did. The *Atrebates* living north of the *Ambiani* and the *Viromandui* resident east of the *Ambiani* might equally well have been inhabitants of this *Belgium*, but Caesar's *Commentarii* do not settle this question.

One thing, however, seems to be sure: during the first three years of war Caesar uses the term *Belgae* in a wide sense. *Belgae* are the inhabitants of the northern part of Gaul as described in the first book. It is not before the fourth year that another significance is possible. In the fifth year the name *Belgium* comes into use. Caesar himself used the word twice (B.G. V 12 and 25), while Aulus Hirtius, who wrote the continuation to Caesar's reports for the years 51 and 50, made mention of this term four times (B.G. VIII 46, 4.6; 49, 1; 54, 4). During the first years of the war Caesar used the name *Belgae* relatively often (B.G. 1–2; II 1–7, 14–15, 17, 19; IV 38), but then he ceased to do so, and at the same time the name was replaced by the names of the individual groups of population. Hirtius used the name *Belgae* twice only (B.G. VII 6; 38).

Examining Caesar's description thoroughly we recognise that Caesar himself mentioned, without noticing it, some significant cultural differences between the population of *Belgium*, the *Belgae sensu stricto*, and the other Belgic peoples. Whereas for the *Ambiani*, *Atrebates*, *Bellovaci*, *Suessiones* and *Remi* Caesar speaks of fortified settlements similar to towns, calling them *oppida*, he reports that the *Morini*, *Menapii*, and *Nervii* did not, when in danger, take refuge in fortified towns, but in swamps and fens or in forests (B.G. II 28; III 28–29; IV 38; VI 5). The *Eburones*, having lost their capital *Atuatuca*, also retreated into swamps and fens in the last days of their revolt (B.G. VI 34). This seems to reveal populations without fortifications of any kind and with entirely different social structures.

It is certainly no accident that Caesar regarded the *Morini* and the *Eburones* (B.G. V 34; VI 36) as *barbari*, the *Nervii* as a *gens* and as *homines feri*, even if he had no clear notion of the real ethnological background.

The varying use of the names *Belgium* and *Belgae* may be explained in two ways: either the name of the *Belgae* was wittingly but erroneously assigned to peoples living north of the country *Belgium* and the *Belgae* proper, or else, the *Belgae* leaving their original home, had subdued non-Belgic populations and given them their name together with their rule. As for the northern populations this question cannot be answered solely on the basis of written documents, even though the example of the *Germani*, which is the name of populations on the Rhine, but which Caesar uses for all peoples living east of the Rhine, makes us think of a transfer of name.

In the case of the *Remi* it might be supposed that they originally were a non-Belgic group dominated by or associated with the *Belgae*. Their hasty union with the Romans already at the very beginning of the second year of war supports the assumption that in doing so they were trying to get free from a foreign oppressor. During the first

year of war the *Haedui* had tried in a similar way to escape the pressure of Ariovistus's *Germani* (B.G. I 31), if Caesar's report is true.

The *Remi* might have become *clientes* of the Belgic *Suessiones*, whose king Divitiacus had not long previously been one of the mightiest in Gaul (B.G. II 4). The fact that the *Remi* saw the *Suessiones* as their kin (B.G. II 12) seems, however, to rule out this assumption. And as if one contradiction is not enough: according to Hirtius' reports of Caesar's eight years, the *Suessiones* were *clientes* of the *Remi* (B.G. VIII 6). If the former masters of the *Remi* — now devoted to Caesar — had been put under the control of the *Remi*, this would not have been a politically unwise or inconsequent decision. Caesar had put the Gaulish *Carnutes* under the command of the *Remi* (B.G. VI 4) and tried to neutralise them this way.

That in fact a specific connection existed between the inhabitants of the small region *Belgium* also becomes very probable if we consider a report of Hirtius about certain events during the eighth year of war (B.G. VIII 7): the *Ambiani*, the *Aulerci*, the *Atrebat*es, and the *Veliocasses* and furthermore the *Caletes* had joined in the last great uprising of the *Bellovaci*. Groups of population settling outside of *Belgium*, the *Morini*, *Menapii*, *Nervii*, *Atuatuci* and the whole of the group of the *Germani cisrhenani*, apparently were not involved. They obviously remained quiet, although during the seventh year of the war *Nervii* and *Morini* had joined the insurrection of Vercingetorix (B.G. VII 75). After the decisive battle they must have returned home (B.G. VII 88). Caesar neither followed them, nor did he send any troops once more to subdue their native countries. They remained free, but pacific, while *Belgium* in a restricted sense was almost definitely subdued during the eighth year of war. A look at the map gives a good idea and a clear picture of what are *Belgae* in a wider sense and of what are *Belgae* in a restricted sense (Fig. 1) (Hawkes, 1968: 9, Fig. 2a).

What could have made the *Belgae* to be a unit of population? A certain not precisely definable need of common action combined with a feeling of kinship which is manifest in the common name *Belgae* and the country *Belgium*. No more can be concluded from the literary sources. Many problems remain obscure and indistinct and this is especially due to the fact that Caesar himself could not have any clear idea of what science would like to know. We want to know too much!

During the second year of war the *Remi* told Caesar that the major part of the *Belgae* were peoples of Germanic origin who had once crossed the Rhine (B.G. II 4) and had driven out the Gauls who settled there before. For the historian this information can hardly be brought into a clear connection with the idea of Belgic groups living in a district called *Belgium* north of the lower course of the Seine. Of course we could ask now, whether and how far Caesar's report was in accordance with the information he received from the *Remi*. We could also ask — assuming that all of the information did stem from the *Remi* — what political decision they intended to cause by such a report. Finally — even if it is safe to assume that the report of the *Remi* entirely coincided with their knowledge — we could discuss the question whether their information accurately reflected the actual historical events.



Fig. 1 Tribal map of Belgic Gaul. The widely dotted region shows Belgic tribes in the wider sense of the word. The densely shaded region shows the Belgic tribes from Caesar's narrative for autumn 54 BC. (Drawn by W. Ventzke.)

In his report Caesar might have mentioned the Germanic origin of the *Belgae* because he wanted to stress the Belgic threat. This would go nicely with the information that the *Belgae* were the only people to withstand the *Cimbri* and *Teutones* (B.G. II 4). The report that the *Atuatuci* were descendants of the *Cimbri* and *Teutones* (B.G. II 29), seems to contain comparatively more credibility than other information from the *Remi*, because this information must originate from the *Atuatuci* themselves. In this instance, neither the *Remi* nor Caesar were interested in any falsification for political ends.

The way Caesar used the name *Belgae* and *Belgium* in his *Commentarii* exerted a definite influence on the usage of future generations. At the latest by 13, but most prob-

ably 27 BC when Augustus began to organise the administration of the country conquered by Caesar, he officially called the north-eastern province reaching from the sea to the Alps *Provincia Belgica*. Now, because they were living in the Belgic province, some peoples were occasionally called *Belgae*, whom Caesar himself would never have thought of in this way.

In the course of the 1st century AD the name of the country and its inhabitants gradually became a literary word. Those historians who referred to *Belgae* or individual Belgic peoples mostly gained their knowledge from Caesar. This is already true for both Livy and Pomponius Mela, but above all for Dio Cassius and Ammianus Marcellinus (Ihm, 1897; 203–7).

Some late reports which were not influenced by Caesar – for example in Pliny (N. Hist. IV 105) and Tacitus (Hist. IV 15, 37, 70) – emphasise by their very scarcity the fact that all really important information on the *Belgae* and *Belgium* is due to Caesar, who owes a part of it to Posidonius.

In Caesar's opinion the *Galli* and *Germani* form *nationes* (B.G. VI 11). This is not said of the *Belgae* and it seems as if Caesar had included them in the *natio Gallorum*. This assumption is supported by the fact that he sometimes names as *Galli* all individual groups of the *Belgae* (B.G. II 17). There exists no special ethnography of the *Belgae* apart from that of the *Galli*, which is widely known (B.G. VI 11–20), but we have in addition ethnographies of the Germanic *Suebi* (B.G. IV 1–3) and of the *Germani* (B.G. VI 21–8) and another one referring to the *Britanni* (B.G. V 13–14), whom Caesar did not consider to be closely related to the *Galli*.

A feeling of fellowship and a desire for common action hint at a Belgic community as early as the second year of the war, and as late as the eighth year of war. This apparently was not due to temporary treaties and relations of dependence but rather to old links of which the nature is unclear.

What Caesar says about the language of the *Belgae* is vague and obscure (B.G. I 1). That there were differences in dialect can be said on general grounds without resort to Caesar. Nothing is known about the kind and extent of such differences. Undoubtedly the *Belgae* in the restricted sense spoke a Celtic type language or dialect. The names of the Belgic *civitates* show no fundamental linguistic difference from those of the *Galli*. The same applies to the personal names and the names of Belgic places. Celtic-type place-names are distributed towards the Rhine (Hachmann, Kossack and Kuhn, 1962: 109–15), but there is good evidence of a minor spread towards the district north of the mouth of the Seine, which can be believed to be *Belgium* proper. Otherwise, farther north outside *Belgium* in a restricted sense there are different types of names (Hachmann, Kossack and Kuhn, 1962: 127–8). Undoubtedly a lot of them are not Celtic, but it is very difficult to decide whether they are Germanic or not.

What Caesar thinks to be typical Belgic *instituta* and *leges* (B.G. I) prove to be simply banalities without much importance, mostly old ethnographic truisms: no contact with the good living of the *Provincia*, little commerce and no importation of luxuries, constantly at war with the Germanic barbarians, that is all Caesar is able to list.

For the rest, the *Belgae* behaved the same way as the Gauls according to Caesar. Apart from the *Morini*, *Menapii*, *Nervii*, and partly the *Eburones* they had fortified places. Their skill in attacking fortified places was equal to that of the Gauls (B.G. II 6). Just like the Gauls they fought on foot or on horseback, except the *Nervii* who had no cavalry at all (B.G. II 17). Just like the Gauls the *Belgae* were of tall stature in contrast to the Romans (B.G. II 30).

It is difficult — if not totally impossible — to draw any further conclusions from these general statements. The feeling of fellowship, the need felt for common action and the existence of a common name, that is all! It would be risky to conclude that there must be still more similarities where there is a common name. May we simply postulate the *Belgae* to be people of one stock and family to avoid such expressions as tribe, clan and race? It is not really permissible to argue in such a way but I fear we are not able to find any better starting-point.

Up to now I have not touched on the problem of the *Belgae* in Britain. Caesar made reference to *Britannia* for the first time after he had finished the second year's war (B.G. II 4), giving the information that Divitiacus, king of the *Suessiones* and mightiest monarch in Gaul, also ruled over in Britain. His son Galba was a contemporary of Caesar. One year later he mentioned the naval connections between the *Veneti* and the inhabitants of *Britannia* (B.G. III 8). Until the fourth year of the war, when he decided to cross the Channel, Caesar had no clear conception concerning the character of the island and its inhabitants (B.G. IV 20). Even after he had tried to get better information from Gaulish merchants, his knowledge remained limited, as he himself stressed. The inhabitants of Britain were called by him *barbari* (B.G. IV 22, 24–5, 32, 34), a term he did not use for *Galli* and *Belgae*, and he believed them to live in *nationes* (B.G. IV 20). He knew that Commius, whom he had made king of the Belgic *Atrebates* (B.G. IV 21), had a great influence upon the Britannic population, but he did not know anything about Atrebatian groups of population in Britain.

Having returned from Britain in 55 BC without any real success, Caesar next year planned once more to invade the island. In connection with the second campaign there is a description of the country and the population of Britain in Caesar's fifth book, in which he seems to show more detailed knowledge. This excursus (B.G. V 12–14) gives a lot of miscellaneous information and is important for that, but it is also important for another reason. It is quite certain that most of it (B.G. V 12–13) is an interpolation written later on either by Caesar or another person (Goette, 1964: 162–95). B.G. V 14 is a direct continuation of B.G. V 11 and obviously stresses the differences between the Gaulish and Britannic population.

The interpolation in B.G. V 12–14 nevertheless remains important because it names *Belgae* as inhabitants of the coastal area in Britain. They are said to have come from *Belgium* and to have the same names as the continental groups of *Belgae*. It is uncertain whether it was Caesar who later on added the interpolation or someone else.

The statement concerning these *Belgae* in Britain is important because it is the only one to give information about a Belgic immigration from the continent to this island.

The only author who was able to give similar information, but not at first hand, was Ptolemy, who names the *Atribatioi* and the town of *Kallea* (Ptol. II 3, 12) which later on is named *Calleva Atrebatum* in the *Itinerariūm Antonini*. Beyond the *Atribatioi* Ptolemy knew the *Belgai* (Ptol. II 3, 12) and the town of *Venta*, named *Venta Belgarum* in the *Itinerariūm Antonini*. It is puzzling to see that Strabo gave no detailed description of the Britannic population, and it is surprising that Tacitus, writing the history of Agricola, who was his father-in-law, knew nothing about the *Belgae* in Britain. The only information he gave concerning the inhabitants of the island says that they were similar to the Gauls and that their language was not very different from the one which was spoken in Gaul (Tacitus Agricola 11), thus contradicting Caesar (B.G. V 14).

III

In the light of these results gained by evaluating the literary sources, archaeology really is in a very difficult position when trying now to contribute to the problem of the *Belgae* and *Belgium*. Should we expect that a vague feeling of fellowship and the awareness of the necessity of common actions and a common name might leave — or even could leave — some traces in archaeological finds? . . . It is hard to say and it is hard to believe!

If archaeology is to give information which is more than banalities about the *Belgae* as a separate entity (N.B.: the *Belgae* in a restricted sense), it could start from the idea that these *Belgae* had a culture common to all of them and different from other cultures. This concept could raise hopes that there is an archaeological culture which deserves the name Belgic. It is only a hypothesis, but it may be an approach to the problem.

In using the word 'culture' I refer to Gordon Childe's conception of this term (Childe, 1935: 1–15). I may leave out further detail on this topic, although my concept of this term is somewhat different. Certainly I am influenced by Childe, but I am influenced also by some anthropologists, mainly by B. Malinowski (1949) and A. R. Radcliffe-Brown (1952) and a little by C. Lévi-Strauss (1958) and by J. Piaget (1968). I am not able to explain these influences, but I feel them.

Because most of our material evidence consists of pottery, every archaeologist is concerned with pottery styles and the changes of pottery style. Of course, it is quite right to begin with pottery, but it is wrong to stop and to remain with pottery, as many scholars do. Touching this topic I would like to quote a passage written by Barry Cunliffe just two years ago. Then he stressed the completely false emphasis which has too often been placed on changes of pottery styles: 'Much of the earlier writing reads as though the Iron Age consisted only of animated ceramics endowed with all the qualities of living creatures, with evolutionary properties appropriate to the theories of Lissenko' (Cunliffe, 1974: 9–10). Applied to the problem of the *Belgae* this means that if we find a certain pottery in *Belgium* of Caesarian date, it is not necessarily pottery produced by Belgic

people, and if we find the same pottery in Britain, it need not be a proof either of a Belgic population or an immigration of such a population.

What can we do then for the continental *Belgae* of *Belgium* by means of archaeology? Pottery does not represent the living culture, but sometimes a certain type of pottery has the same area of distribution as a culture which it is a part of. What can we gain by studying ceramics? I would like to explain the problem and to answer this question by means of Christopher Hawkes' map showing the distribution of pedestal urns (Hawkes and Dunning, 1931: 189, Fig. 7). The distribution of this kind of vessel seems to be totally clear, but its meaning has to be explained. In England the map truly reflects the use of urns of this kind in ancient times. In Northern France we cannot immediately discern the original distribution. The activity of archaeologists varies in different parts of this region, and the map especially reflects activities in the Champagne and in the Pays de Caux and Pays de Bray regions. At the same time, the map shows approximately the northern frontier of the pedestal urns, which are almost unknown in the Netherlands and in present-day Belgium. But there are vessels of this kind in Central and Southern France and in Western Germany. Pedestal urns are a common kind of pottery all over Gaul in the early Augustan period. They are not a type, but a kind of pottery embracing several different types: British urns generally differ from those in Northern France; in the Moselle and Rhine region there is a special type. There is, in addition, a special type in Southern France (Fouet, 1970: 11–33, Figs. 1–8).

There is, however, also a distinct type of pedestal urn having horizontal ridges in North-eastern Normandy in the Pays de Caux and the Pays de Bray regions on both sides of the lower Seine that has some close parallels in South-eastern England (Fig. 2). Are we allowed to regard these pedestal urns with horizontal ridges as a typical Belgic product? ... It might be! ... But there is one difficulty among others: most of the pedestal urns are late. They must be dated in the beginning of the reign of Augustus. There is another difficulty: how can we discover to what extent pedestal urns with horizontal ridges were exported from the continent to this island or *vice versa*? Initially we recognise only the market area of this kind of vessel.

As a whole the map of pedestal urns shows nothing but certain commercial connections and especially cultural connections between France and Britain. So do other maps, for instance the one representing large S-sided bowls and biconical jars drawn by Ann Birchall (1965: 259, Fig. 1).

It is quite right to start an analysis of archaeological material with an examination of types of objects, but then we must proceed to investigations of cultural structures and functions. Ann Birchall was right to take the grave-types into consideration. But funerary practices both in South-eastern England and in Northern France and in the Moselle–Rhine region are almost the same. Every person was burnt on a pyre and the burnt bones were put into a cinerary urn. Mostly we have flat graves. As a rule, in ordinary graves, considerable numbers of pots, but only a few other objects, accompany the cinerary urn. But there are some extremely rich grave-inventories, for example from Welwyn Garden City (Stead, 1967: 1–61), from Goeblingen-Nospelt in Luxembourg (Thill, 1966: 483–

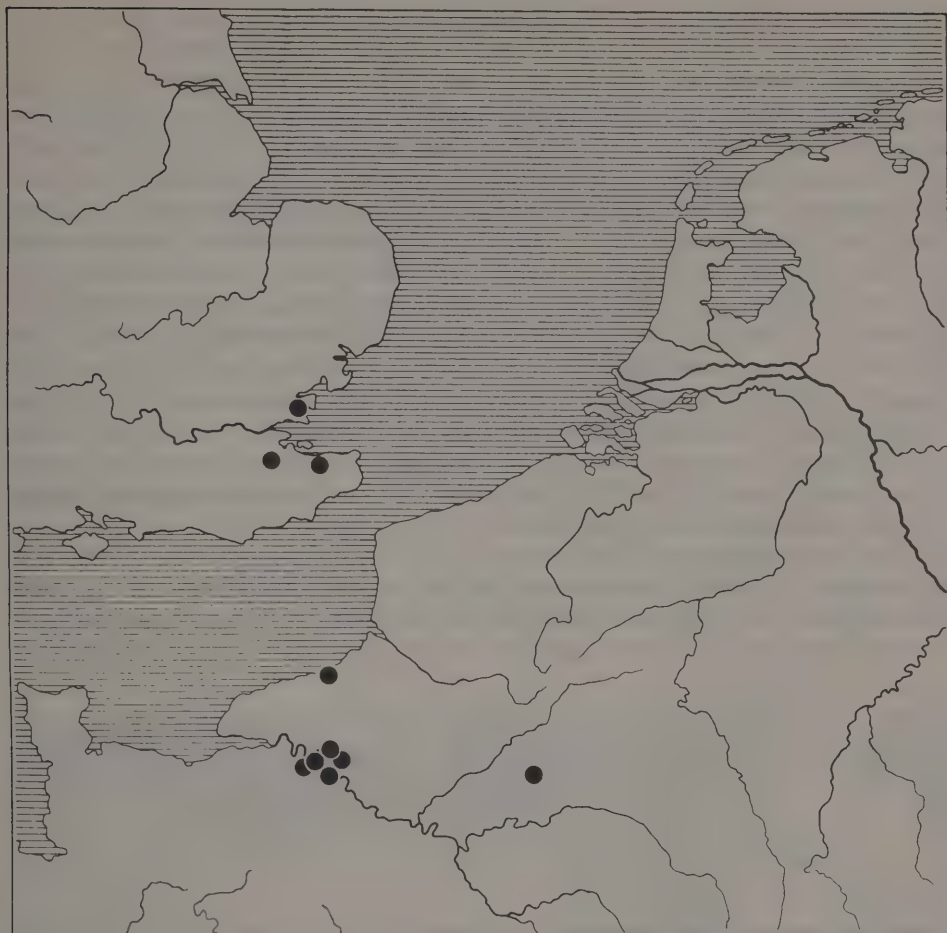


Fig. 2 Distribution of pedestal urns with horizontal ridges. (Drawn by W. Ventzke.)

91; 1967: 199–213), from Hoppstätten in the Moselle region (Behrens, 1950: 22–6), or from Fontillet, Dép. Cher, in France (de Laugardière, 1875: 1–29).

Some generations ago archaeologists thought the cinerary urn population to be a new one having conquered the territory of a preceding inhumation grave population. That is certainly not always wrong, but in this region, as far as we can see, there was no more than a change in the funeral rite. Wherever we have good observations from cemeteries, though we do not get such observations very often, we can see continuity of burial-places. The Horath cemetery near Trier provides a good example (Kimmig, 1937: 83–8).

When looking for an archaeological culture which might be Belgic, it is no solution to argue from single types of objects or from the funeral rite. Culture has structural and

functional aspects. When studying archaeological materials we have to look for these aspects, and we have to find particular conditions in the domain of religious practices, in sociological conditions and in economic affairs. In the case of the *Belgae* both on the continent and in this country the archaeologist really hopes to find clear cultural boundaries and he hopes that the boundaries can be determined by the distribution of types. But that is only a first step. Everyone knows what it is like to be often confronted with situations where the types do not show what the archaeologist would like to see. The distribution of types depends upon commerce, custom or fashion. Pedestal urns are a matter of fashion in most parts of Gaul. It is a Gaulish fashion, not a Belgic one.

The distribution of types is, as easily can be seen, not enough and I would like to emphasise, too, that a sum of type areas is not at all sufficient as a criterion for a culture. We have to look for traces of the religious sphere when we are examining archaeological finds. We have to search for typical traces of human society and economy. We have to go in quest of them everywhere in settlements, tombs and hoards.

But concerning the problem of the *Belgae*, in spite of such considerations we cannot proceed directly. The state of research in different regions is quite different and this sometimes constitutes a serious obstacle.

If I try to map objects or structures of a special economic or social value, the map often remains inadequate because of the bad state of investigations in Northern France and sometimes also in present-day Belgium. But in spite of this, we can occasionally see something. We can use a map showing the distribution of currency bars (Fig. 3) as an



Fig. 3 Distribution of currency bars. (Drawn by W. Ventzke.)

example, and a map with hoards containing iron objects shows almost the same distribution (Fig. 4). Southern Britain, Northern France and parts of Southern Belgium and Western Germany have common traits of the same cultural structure. I can add another map showing the distribution of fortified settlements (Fig. 5). All these different maps comprise a complex of very similar cultural entities. The maps of hoards with currency bars and of hoards with iron objects reflect some special economic conditions. But especially the map for the fortified settlements shows something more. It shows clearly that in Northern Belgium fortifications are unknown. That means: in the north there must have been a kind of social life different from the south.

Furthermore we can demonstrate by means of funeral customs that in the north there were quite different religious practices. These people, too, burned their dead. They had cinerary urns as well, but they put the urns into flat barrows and as a rule no further objects were included in the interments. In addition these people produced a special kind of hand-made pottery. The small group of cemeteries found in Belgium is simply the southern frontier of a culture well represented in the Netherlands and Western Germany, and called the Kempen or Campine Group in Belgium (Mariën, 1952: 368–74).

South of the Kempen Group we have several smaller groups, each with its funeral customs and its own pottery types. Because of the state of investigations in Belgium, the characteristics of groups there are not yet totally clear (Mariën, 1971: 211–41). Some of them are poorly defined. But the distribution of hoards and of fortified settlements and the different types of cemeteries and grave groups show one very important fact: the



Fig. 4 Distributions of hoards containing iron tools. (Drawn by W. Ventzke.)



Fig. 5 Map showing the distribution of late La Tène fortifications in Northern France, Belgium and Western Germany (in France after Büchsenschütz, in Belgium mainly after De Laet, in Germany after Hachmann, Kossack and Kuhn). (Drawn by W. Ventzke.)

country of the *Belgae* in the broad sense of the name is not a cultural entity. It contains a huge group in the south reaching from Britain across Northern France to Southern Germany, but it comprises several different cultural groups in the north. Besides, this distribution shows another fact: archaeology shows no frontier between the *Belgae* in the wide sense of the name and the *Galli* and we are tempted to ask whether there was a real difference or not.

But another problem is much more important: what can we do for the *Belgae* of ancient *Belgium* in the restricted sense of the word? What can we say about the archaeological finds of the region north of the lower Seine? Sir Mortimer Wheeler has done some

work which helps to provide a good answer. North of the Seine we have his well defined Fécamp type fortifications (Wheeler and Richardson, 1957: 8–14). Are these fortified settlements Belgic in the newly defined sense?

Unfortunately Sir Mortimer Wheeler's excavations did not produce any material helpful for dating this fortification type. Up to date we do not know exactly when they were built or when they were abandoned, nor do we know why and against whom they were constructed. Why did not their walls contain any considerable amount of stones? There are fortifications of a similar type in Britain (Cunliffe, 1974: 72–3), but for them a rather late date is suggested. I fear today that we must leave the problem of the Fécamp type fortifications unsettled. We must consider that the region examined by Wheeler is rather limited and we really cannot exclude the possibility of the Fécamp type being found by future excavations south of the border of Wheeler's activity.

In the same region we have several cemeteries with cremation interments. Unfortunately most of them were not carefully studied. Here, cremation seems to have been an old tradition down to the Early La Tène period. In addition to pedestal urns there occur pots with horizontal ridges turned on the wheel and simple pots with a moulding just below the rim. I know only one good closed find, from Armentières, dating this pottery to the time of Caesar or just before Caesar (Birchall, 1965: 352, Fig. 29).

It is worth noticing that there is similar pottery in South-eastern Britain. But the funeral rites north of the lower Seine are too poorly defined to be compared with those on the other side of the Channel.

IV

Considering the results of examining both the literary and the archaeological sources we become aware of several detailed conclusions. The problem of the *Belgae* obviously must remain unsolved, but seeing it from the continent may have given some hints for solution in the future. It seems to be necessary to divide the problem into different parts, which have to be treated independently, but which ought to be solved by the parallel efforts of philologists, historians and archaeologists. These are the results of a rather preliminary survey: we have gained a clear idea of a country *Belgium* in a restricted sense with a rather small number of groups of population. Following Caesar's report this country must be situated north of the lower Seine, and comprise the *Ambiani*, the *Atrebates*, the *Bellovaci*, the *Caleti*, the *Suessiones*, the *Veliocasses* and the *Viromandui*.

Examining the archaeological sources independently we get different results: at first we can see that Southern Britain, Northern France, a certain part of Southern Belgium and Western Germany at the time of Caesar, and also later on during the reign of Augustus, form a kind of cultural *koine*, or, we may say, a complex of cultures. Secondly we can recognise that the culture of most parts of present-day Belgium, of the Netherlands and – I should like to add – North-western Germany is quite different. Thirdly we have discovered that the culture in Northern France is not totally uniform. We can see like a shadow a cultural group north of the Seine perhaps reaching some territory on the

other side of the river. We have gained a clear idea of the material culture of this group, but, also, a neutral image of the religious customs and of social organisation. But I would like to stress: it is only a shadow. Fourthly we can recognise that there are parallels in Britain to types found within the group north of the Seine. But most of the British objects showing parallels to the continent are rather late, dating about the early part of the reign of Augustus.

If we try at least to compare the results given by the examination of literary sources and archaeological finds, we find a satisfactory correspondence between the different suggestions. We do not find any archaeological argument contrary to results obtained from literary sources, and we cannot see any philological argument against the analysis of the archaeological objects. Reconsidering the problems of the *Belgae*, there is of course no solution marching across the problems in double-quick time. But there seems to be a certain result as far as method is concerned — or to be more cautious: some progress may have been made in methodology and there may be some hints of future work which could be practicable.

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Ca Na Costa: A megalithic chamber tomb on Formentera, Balearic islands

by CELIA TOPP, J. H. FERNANDEZ and L. PLANTALAMOR

I. Description of the monument and its environment

The megalithic chamber tomb known as Ca Na Costa, in the Balearic island of Formentera, stands on the 5 m. contour line. Its reference is latitude $38^{\circ}43'28''$ and longitude $5^{\circ}07'59''$ on sheet 824 of the Military Map of 1960 (scale 1:25,000). The nearest township is Es Pujols which lies 1,200 m. to the east (Fig. 1). The monument is easily accessible from there: it lies in an urbanisation sited beside a branch road (which leads to Las Salinas) off the main road between La Sabina and La Mola.

There is very little variation in the surface level of Formentera which is uniformly flat; its highest point is La Atalaia de La Mola, 202 m. above sea-level. The chamber tomb was built on the highest point of the area and commands a good view of the Estany Pudent, a shallow salty lagoon some 400 m. to the west of Ca Na Costa.

The geological formation of Formentera consists exclusively of Miocene limestone, similar in nature to that of Ibiza. The two islands were still united in recent geological times (Colom, 1950: 120).

The tomb itself is built entirely of this local limestone which outcrops over the whole island and is still used extensively for present-day construction. Although well known in the island and, unfortunately, used over many years as a convenient quarry for roads and field-walls, the monument was in surprisingly good condition. Its preservation, as opposed to the destruction of many other local early sites, may be due to two factors. Only a few metres distant stands a house which, until recent years, was used as a brothel: this fact would tend to make the area unpopular among a small peasant community during working hours. An even more important reason for the tomb's well-nigh miraculous survival is that it is currently considered to be an ancient sundial. This concept was largely due to the presence of a wild olive tree, planted there some 50 years ago, growing in the very centre of the chamber. The 'sun-clock' belief is widespread in the island, from local authorities to labourers, and respect for a 'useful' object by still fairly primitive peasants probably provides the main reason for the Ca Na Costa's preservation.

During the summer of 1974, the new Director of the Ibiza Museum, acting on information received, visited the site in company with the also newly-appointed Director of the Menorca Museum and only then was Ca Na Costa's real significance recognised.

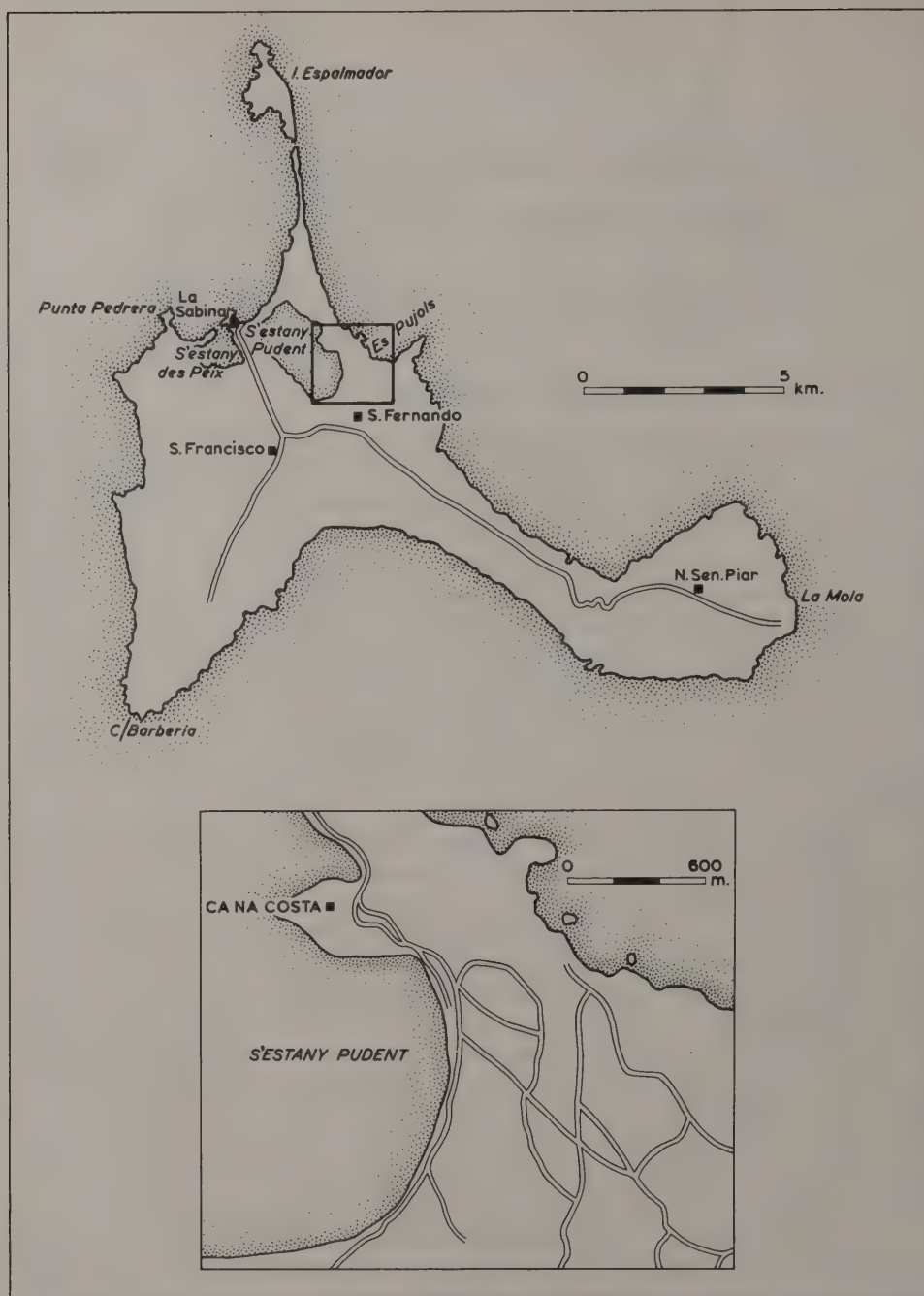


Fig. 1 Map of Formentera with enlargement of one section to show location of Ca Na Costa.

Funds were obtained from the Comisaría de Excavaciones Arqueológicas in Madrid and the excavation duly took place in February 1975, under the direction of the authors, headed by Don Jorge Fernandez, Director of the Ibiza Archaeological Museum. All the plans and line drawings are the work of Don Luis Plantalamor, Director of the Museum of Menorca. Further assistance was provided by professors and pupils of the Ibiza Instituto de Enseñanza Media and various other volunteer workers.

II. The excavation

Plate I shows the monument previous to excavation. The orthostats of the chamber stood about 1 m. above the soil and scrub but the passage stones were only just visible on the surface.

From the start there was no doubt whatsoever that the chamber-tomb was an orthostatic passage-grave in the Millaran tradition, the first ever to be located in the Balearic Archipelago (Fig. 2). The excavation lasted 10 days; the monument was cleared down to bed-rock, planned and photographed in detail and the area surrounded by a wire-fence as a protection. It is in the process of being scheduled as a National Monument by the competent authorities.

After clearance of scrub and scattered stones the site was surveyed by triangulation — owing to the lack of any other means — along two main axial lines, north to south and east to west and an area of 10 m. x 10 m. delimited for excavation.



Plate I The site prior to excavation.

Ca Na Costa was excavated as three distinct units: the passage, the chamber and the surrounding area.

The passage (Figs. 2 and 3 and Plates II and VIII)

The passage was 2.5 m. long and its height varied from 0.65 m. (at the entrance) to 0.75 m. at the access to the chamber. The entrance was to the west and at this point the passage was 0.8 m. wide but broadened out gradually until it measured 1.2 m. at the chamber.

The passage was built of two opposed matching pairs of small orthostats, the smaller at the entrance end. Here lay a stone, set transversely to the smaller pair of orthostats, which was at first thought to be a door stone but it became clear after further

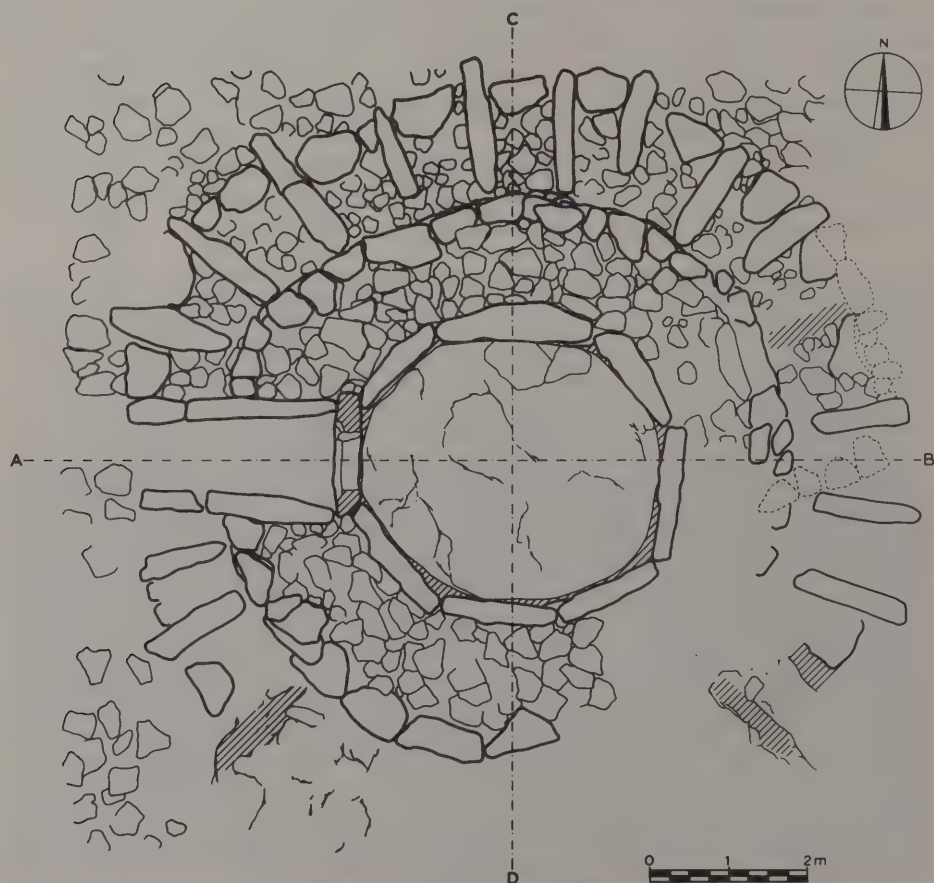


Fig. 2 Plan of the chamber tomb.

excavation that it was not *in situ*: there was an intervening layer of earth between it and bed-rock. It might possibly have formed part of the passage roof (of which the only traces left were fallen fragments among the infilling). It was removed at a later stage of the excavation and does not figure on the plan.

At the eastern end of the passage were the very clear remains of a porthole stone 0.75 m. high which gave access to the chamber. This stone was badly damaged on its right-hand (or southern) side but its nature was unmistakable almost from the very start. Most probably the porthole entrance consisted of a single stone though the possibility of a second upper one cannot be altogether excluded.

Excavation began at the western (or entrance) end of the passage which was cleared levelly down to the natural rock. It was soon obvious that there existed no possibility of



Plate II The passage during excavation.

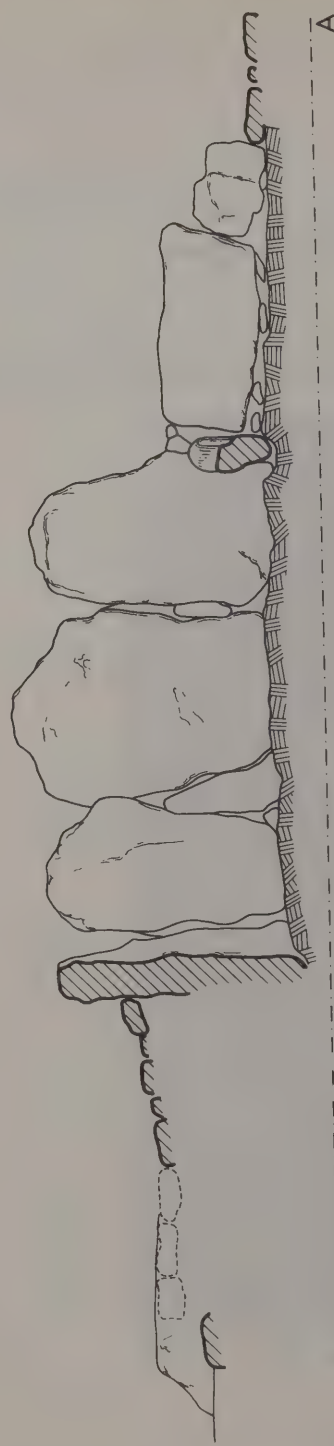


Fig. 3 E.-W. and N.-S. sections of tomb.

establishing any stratigraphy since there had been deep disturbance of fairly recent date throughout the length of the passage.

The finds consisted mainly of sea shells, sherds of various periods ranging from prehistoric to modern and bones, both animal and human. A small concentration of the latter lay beside and beneath the porthole stone. Among them was a large sacrum and fragments of long bones, all lying in disorder and obviously not in their original position. The only other recognisable bones were those of the (probably recent) skeleton of a small rodent, some human phalanges, rib fragments and the right-hand portion of a human mandible.

There were no signs of any intentional infilling or blocking, nor of charcoal or heat-discoloration. There were, however, traces of paving at the entrance end which further investigation showed to form part of the basic platform of the surrounding area.

The passage roof remains a matter of conjecture. It might have consisted of transverse slabs (since robbed or broken) placed directly on the two pairs of orthostats. There might even never have been a roof at all, the only possible traces being the stone fragments found among the infilling. There were certainly no remains whatsoever of any courses of dry-masonry above the orthostats.

The chamber (Figs. 2 and 3 and Plates III, VII, VIII)

The chamber was of circular plan with an internal diameter of 3.8 m. E to W and 3.4 m. N to S. It consisted of seven large orthostats, of local limestone, which had an average height of 2 m. and a width varying from 0.3 m. to 0.4 m.

The chamber was excavated on the basis of the quadrant method. After clearance of scrub and removal of the topsoil all the earth from within the chamber was sieved. Thanks to this, many minute sherds, and in addition the two incised fragments, some of the bone V-perforated buttons and two tiny disc beads of bone were recovered.

Excavation began in quadrant 3, the S.E. one, and it unfortunately was evident from the start that here again there existed no stratigraphy since there had been fairly recent disturbance within the chamber. As in the passage, there were shells and sherds of many varieties and periods throughout the chamber at all levels. This disturbance was particularly noticeable in the central area where a large pit had been dug when the tree was planted. There the soil was not only loose, as in all the upper level (some 0.3 m. deep) of the chamber, but also very black — a true humus. Among the roots of this tree, very near the surface, was found a fragment with a nipple lug, in quadrant 2.

In the lower level, close to the uprights, the earth was more compact, lighter in colour and contained numerous large stone fragments lying at 0.2 m. below the surface. These were especially apparent in quadrants 3 and 4 (Plate III). Beneath the fallen blocks of quadrant 3 a few coherent human bones and hand-made sherds were lying in disorder beside orthostat no. 5, as though pushed there to make room for a later interment. If, as the writers deduce, these stone fragments and compact earth represent the fallen-in roof of the chamber, these finds may well be the only ones *in situ*, even though no longer in their original position.



Plate III Quadrants 3 and 4 of the chamber showing large fallen stones and wedge between uprights.

The floor of the chamber was the rock itself in which had been grooved a shallow circular trench which acted as the orthostats' socket (Plate VII). This most skilful and symmetrical groove provides one of the many unusual features of Ca Na Costa and illustrates its exceptional planning and execution.

As in the passage, there were no traces of courses of either stones or dry-masonry above the orthostats, no charcoal and no signs of fire. The entire chamber was cleared down to the natural rock and the large stones found in the infilling of quadrants 3 and 4 were heaped together at the base of orthostat no. 4.

The possible nature of the chamber's covering will best be discussed at a later stage, after an account of the surrounding area.

The surrounding area (Figs. 2 and 3 and Plates IV, V, VI, IX)

The passage-grave was first surrounded by a retaining wall which met and stopped short at the passage about halfway along its length (see Plan, Fig. 2). This wall was faced with medium-sized stone courses of which at least three still remained in the northern sector (Plate V). The intervening space between this facing and the chamber orthostats consisted of an infilling of small stones and compact earth.

The tomb builders must then have, rightly, decided that this wall alone would not provide sufficient support for the chamber orthostats and the covering. To strengthen it

CA NA COSTA: A MEGALITHIC CHAMBER TOMB ON FORMENTERA



Plate IV Northern aspect showing the uprights, retaining wall, radials with inter-radial filling and part of external platform.



Plate V Overall view of the site seen from the north after excavation.

they added large solid stone blocks to act as buttresses (Plates V and IX). Like the orthostats, these buttresses were embedded in grooves cut into the bedrock (Plate VI). They were positioned radially and symmetrically and their functional purpose is quite unmistakable. Originally they must have numbered 24 but most of those in the southern sector have vanished and probably now form part of the adjacent field walls and buildings. However, many of their sockets were easily identified and the amazing symmetry of the whole monument leads to the assumption that both sides must have corresponded. There are at present 14 radials *in situ* and four sockets still in evidence.



Plate VI Overall view of the site, southern aspect, showing sockets of missing radials.

The spaces between the radials were filled with small stones and compact earth. Yet further solidity was ensured by retaining kerbstones binding the radials together at their point of juncture with the platform (Plate IV).

This platform of rough limestone paving surrounds the whole structure, but its area could not be delimited during this first excavation.

There were few finds in the surrounding area: some shells and sherds of all sorts, although there seemed to be less disturbance in this area than in the passage and chamber.

There existed no traces of any forecourt structure nor of ritual: no charcoal specks, no heat-discoloured patches, no pits, no intentionally placed vessels or sherds, no infilling nor blocking.

Eventually, the entire surrounding area, excepting the platform, was cleared and only the walls and radials left standing.

CA NA COSTA: A MEGALITHIC CHAMBER TOMB ON FORMENTERA



Plate VII Interior view of the chamber showing uprights and wedge-stones in rock-cut groove.



Plate VIII Western view of passage and chamber after excavation.

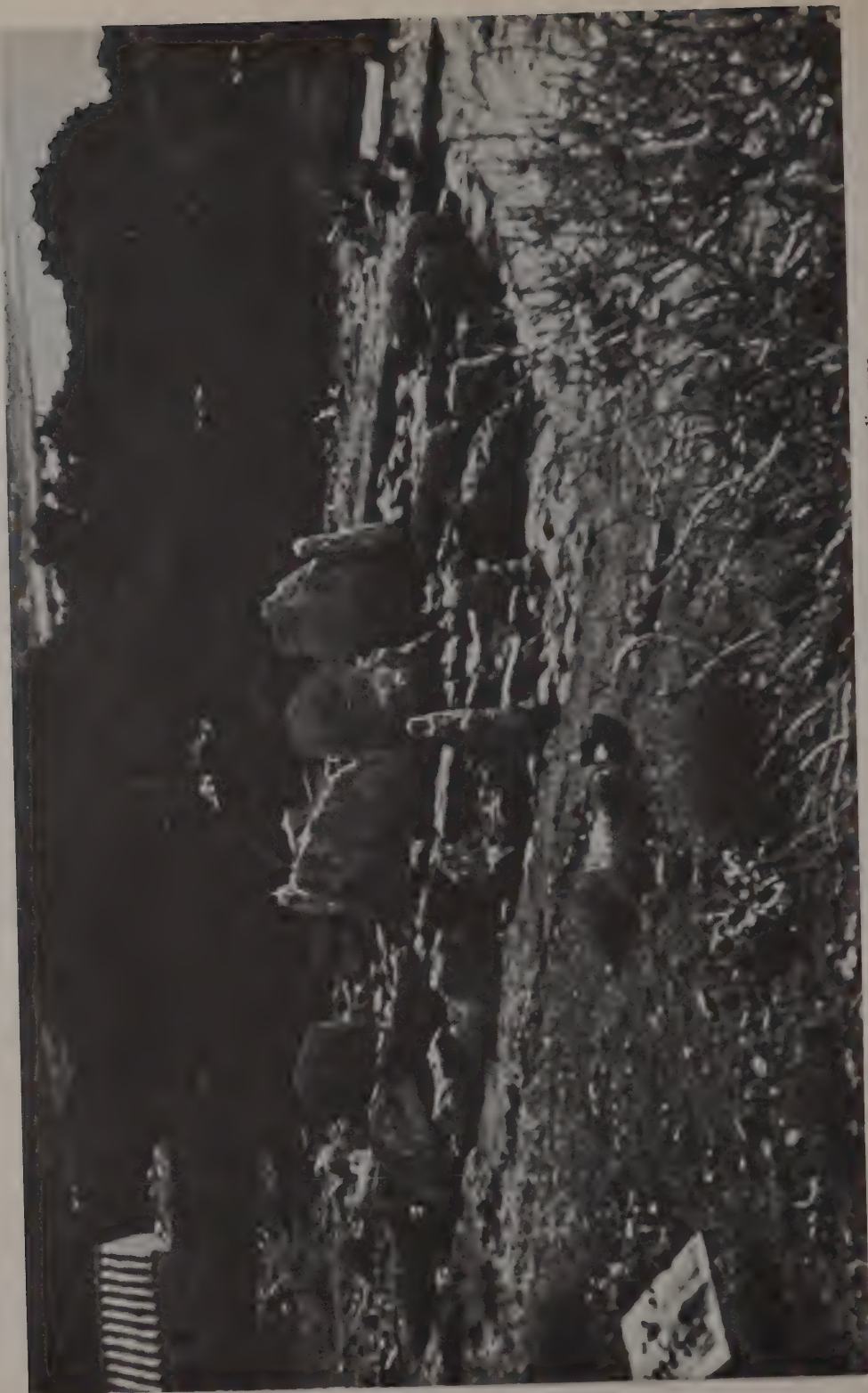


Plate IX

Overall view of Ca Na Costa from above showing the surrounding area.

III. The finds

The pottery

QUADRANT 1 OF CHAMBER (Fig. 4)

- No. 1. Rim fragment – probably of a bowl with slightly everted rim. Of greyish colour with orange lines and abundant grits.
- No. 2. Fragments of a bowl smoothed on both surfaces. Grey on outer face, reddish on inner one – gritted.
- No. 3. Rim fragment of a thin-walled carinated bowl, the outer greyish surface smoother than the blackish inner one. Gritted. Max. diam.: 0.210 m.

QUADRANT 2 (Fig. 6)

- No. 7. Rim fragment of a vessel of flower-pot shape with everted walls and rim. Black, smoothed on both surfaces – with gritty inclusions and a nipple-lug. Max. diam.: 0.186 m.
- No. 8. Rim fragment of a straight-sided vessel of flower-pot shape. Dark-grey, smoothed surfaces, grits.
- No. 9. Rim fragment of an incurving bowl of blackish colour, smoothed surfaces – gritted. Max. diam. 0.110 m.
- No. 10. Rim fragment of a bowl of blackish colour with pink hues. Very well fired and smoothed.
- No. 11. Rim fragment of an everted bowl of grey colour. smoothed and gritted.
- No. 12. Rim fragment of a greyish-black pot. Smoothed and gritted.
- No. 13. Rim fragment of an incurving bowl. Grey, smoothed and gritted.
- No. 14. Rim fragment of an incurving bowl. Reddish pink, smoothed and gritted.
- No. 15. Amorphous rim fragment. Pinkish-red and with smoothed outer surface, gritted.
- No. 16. Flat rim fragment possibly belonging to a small bowl. Inner surface black, outer pinkish. Smoothed and gritted on both faces.
- No. 17. Rim fragment possibly belonging to a small fine-walled bowl. Greyish, smoothed and very finely gritted on both faces.

QUADRANT 3 (Figs. 6 and 9)

- No. 26. Two rim fragments of a flower-pot shaped vessel of light brown colour. Gritted.
- No. 27. Rim fragment of an incurving bowl. The inner surface black, the outer of the same colour but with lighter hues. Smoothed and gritted.
- No. 28. Rim fragment of a bowl with incurving walls. Grey-smoothed on the outer surface and gritted.
- No. 29. Rim fragment of a bowl of similar shape. Black, smoothed and gritted.
- No. 30. Rim fragment of a bowl of similar shape. Blackish, smoothed and gritted.
- No. 31. Fragment of a pot, possibly of globular shape. Blackish, smoothed and gritted.
- No. 32. Rim fragment of a bowl. Inner surface of blackish colour, outer one reddish-grey. Smoothed on inner surface. Gritted.
- No. 33. Rim fragment of a flat-rimmed bowl. Black on inner surface, greyish-pink on outer. Smoothed and only lightly gritted.
- No. 34. Rim fragment of a bowl inturned profile. Black, smoothed and gritted on both faces.
- No. 35. Rim fragment of small globular shaped vessel. Inner surface black, outer one greyish-pink. Smoothed and gritted.

QUADRANT 4 (Figs. 9, 10 and 12)

- No. 36. Rim fragment of a small pot of globular shape with very thin walls. Very well and evenly fired. Pinkish-buff, burnished black on both faces and very finely gritted.
- No. 37. Rim fragment, possibly of a bowl. Very well fired. Black within, buff without and burnished on both faces. Very fine grits.
- No. 38. Rim fragment of a thick-walled vessel. Even colour (pinish-buff) throughout and smoothed on both faces. Thickly gritted.
- No. 39. Rim fragment of a thin-walled bowl. Evenly fired, black and burnished on both faces. Finely gritted.
- No. 40. Rim fragment possibly belonging to a bowl with walls of medium thickness. Buff-grey, smoothed on both faces. Large grits evenly distributed.
- No. 41. Rim fragment, flattened and slightly everted, belonging to a vessel with medium thick walls and probably bowl-shaped. Buff coloured and smoothed on both surfaces. Finely gritted.

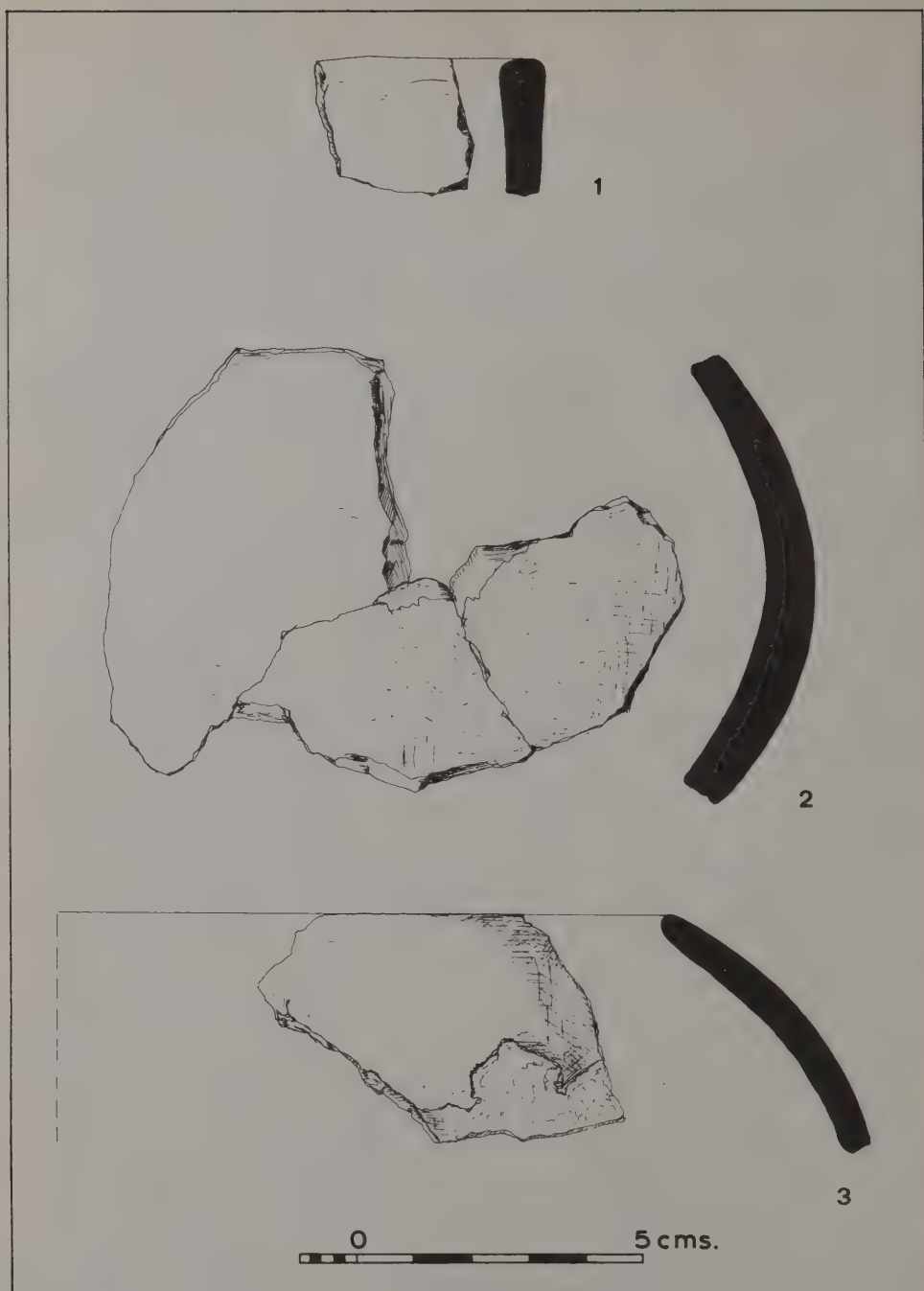


Fig. 4 Pottery from Quadrant 1 of Chamber.

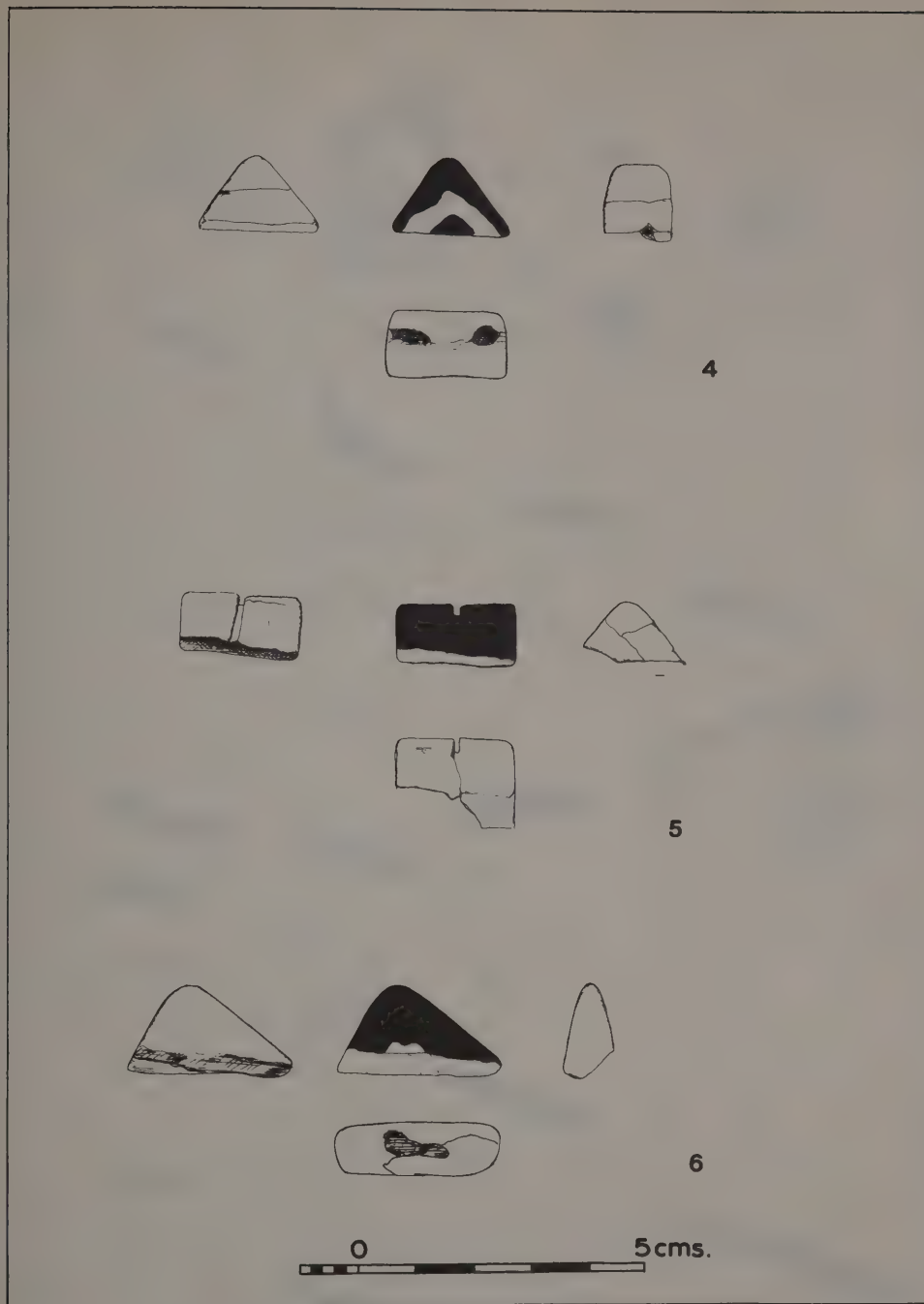


Fig. 5 V-perforated buttons from Quadrant 1 of Chamber.

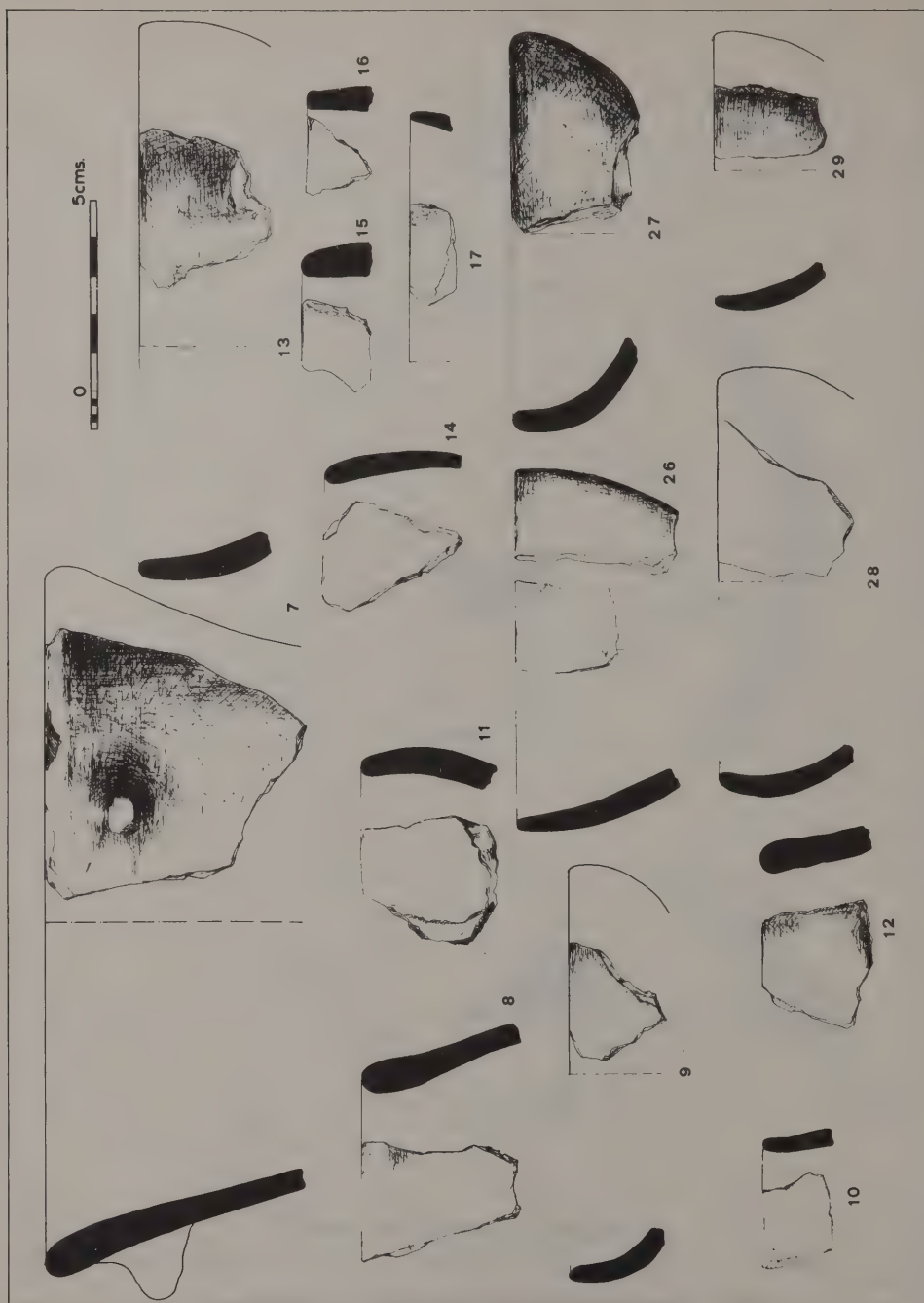


Fig. 6 Pottery from Quadrants 2 and 3 of Chamber.

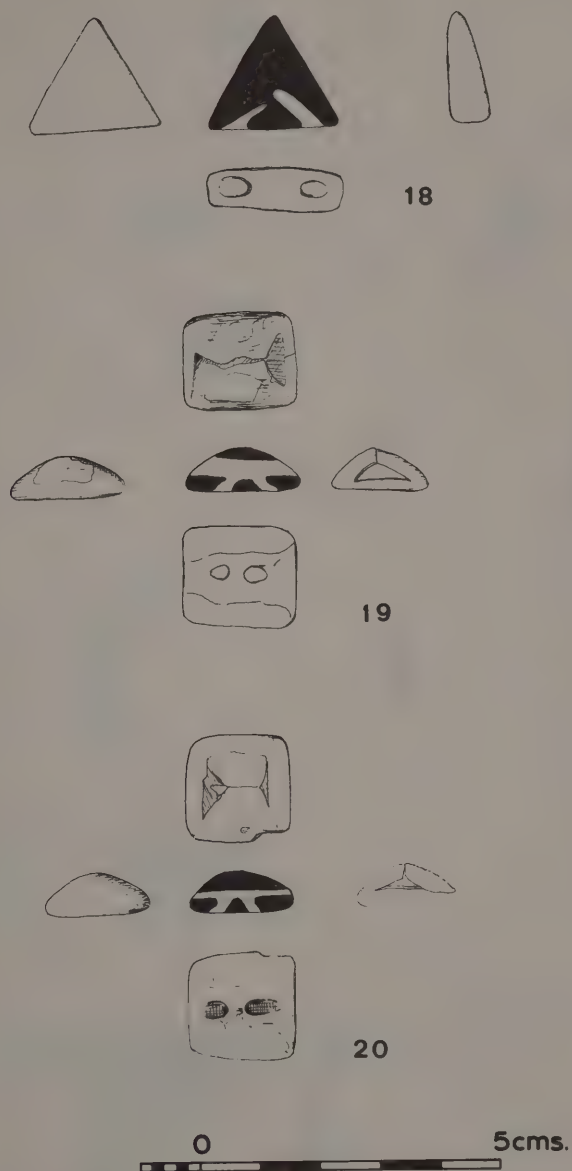


Fig. 7 Triangular and pyramidal buttons from Quadrant 2 of Chamber.

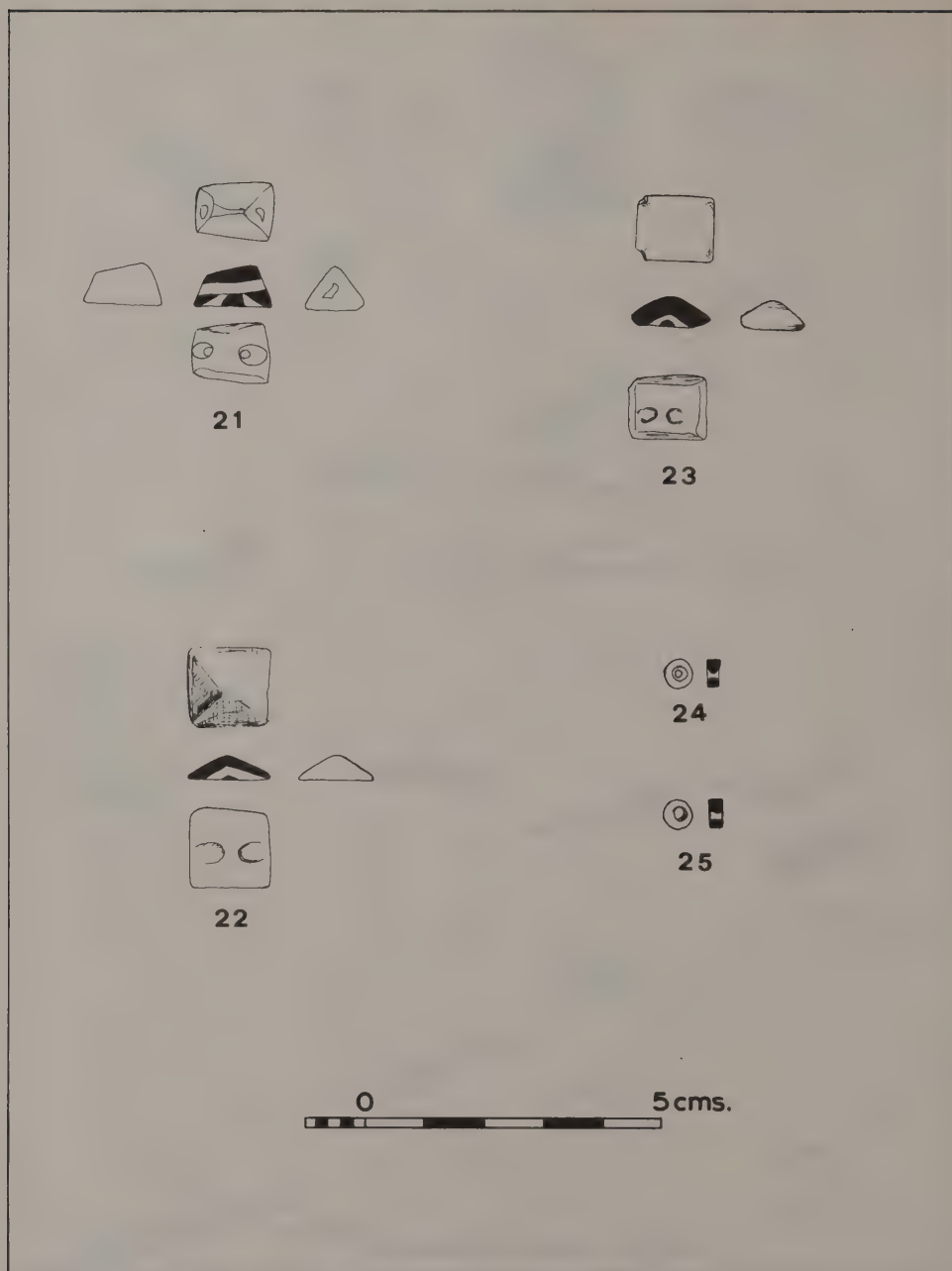


Fig. 8 Buttons and beads from Quadrant 2 of Chamber.

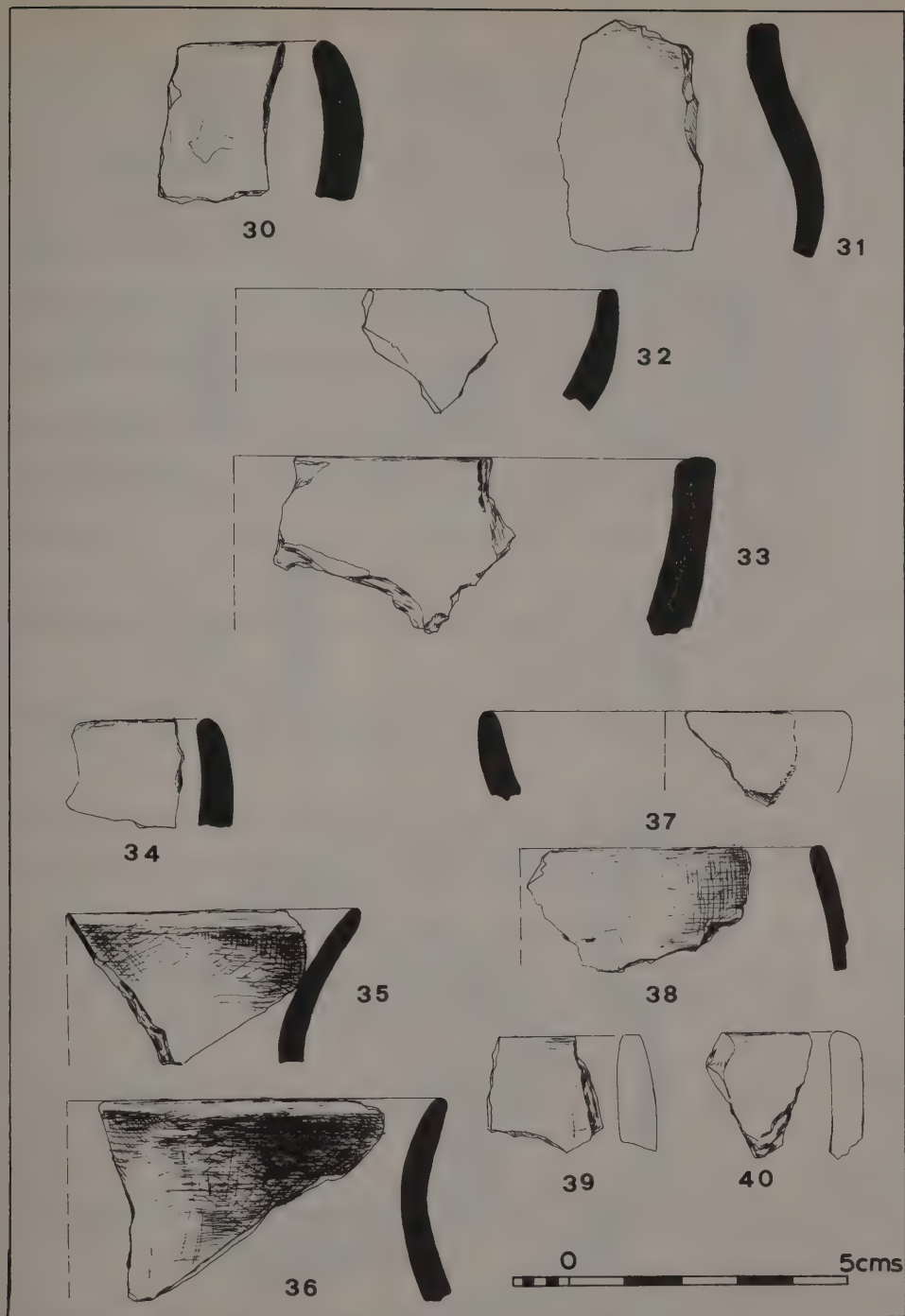


Fig. 9 Pottery from Quadrants 3 and 4 of Chamber.

- No. 42 Rim fragment of a bowl with incurving walls of thin section. Greyish-buff throughout, more smoothed on the inner surface than on the outer and thickly gritted.
- No. 43 Rim fragment, probably of a vessel with straight walls of medium thickness. Buff-coloured and smoothed on both surfaces. Finely gritted.
- No. 44 Rim fragment, of triangular section, flattened and rolled inwards, of a thick walled vessel possibly of flower-pot shape. Evenly fired, black and smoothed on both faces. Thick grits evenly distributed.
- No. 45 Fragment of a thin-walled pot, of sinuous profile, possibly of globular shape, evenly fired, dark pink and smoothed on outer surface. Many fine grits throughout and on both surfaces.
- No. 46 Incised sherd of dark coloured clay. Smoothed, containing many grits. The pattern consists of a hatched band and traces of another possible one above.
- No. 47 Incised sherd, blackish-pink, well fired and thin sectioned, many grits, especially on outer surface. The pattern consists of the remnants of two hatched bands of either lozenges or triangles with a plain zone between them.
- No. 48 Large fragment of a thin-walled globular pot of marked curved profile. The inner surface is black, the outer pinkish-grey. Very evenly fired, smoothed without, burnished within. Very fine grits evenly distributed.
- No. 55 Fragment of the upper portion of a bowl of curving section. Blackish-brown, gritted.
- No. 56 Rim fragment of a pot of everted shape and grey-pink colour. Very evenly fired and gritted. Smoothed on both surfaces.
- No. 57 Body fragment of a small vessel of blackish colour and rough texture. The sherd has four small perforations made before firing from the inside. It might possibly be a portion of a 'cheese strainer'.
- No. 58 Fragment of a collared grey pot of a globular shape, well-fired with fine grits evenly distributed.

FROM THE PASSAGE (Fig. 12)

- No. 59 Rim fragment of a bowl with everted rim. Brown on outer surface and smoothed, grey and rough on inner. Very fine grits.

FROM RADIAL B (Fig. 12)

- No. 60 Rim fragment of a small pot of sinuous profile and greyish-pink colour. Very well-fired. Smoother on inner surface than on outer one. Many evenly distributed grits, especially on the outer face.

FROM THE PLATFORM (Fig. 12)

- No. 61 Rim fragment of a bowl with thin curving walls, grey and very gritty, buff hues on outer surface. Rough on both surfaces. Mouth diam.: 0.109 m.
- No. 62 Rim fragment, possibly of a straight necked globular pot with thickish walls. Grey and well gritted. Smoothed on outer surface. Very weathered and friable.

S.W.—S.E. SECTOR OF SURROUNDING AREA (Figs. 12 and 13)

- No. 63 Flattened rim-fragment of a straight-necked pot. Black and gritty on inner surface, reddish-brown on outer. Remains of smoothing on both faces. Mouth diam.: 0.162 m.
- No. 64 Fragment possibly belonging to a vessel of flower-pot shape. Inner surface grey, outer light brown, gritted and rough on both faces. It has a flattened horizontal side lug.

FROM S.W. SECTOR OF SURROUNDING AREA (Fig. 13)

- No. 65 Rim-fragment of a thick-walled pot of globular shape with slightly everted rim. Outer surface pinkish-grey and lightly smoothed, the inner grey and rough. Mouth diam.: 0.162 m.

Stone

FROM THE N.E. ANGLE OF THE SURROUNDING AREA (Fig. 13)

- No. 66 A piece of granite, shaped and smoothed. Of cubic shape with slightly curved sides and obtuse angles. Side diam.: 0.043 m.

FROM S.W. SECTOR OF SURROUNDING AREA

- No. 67 A fragment of pumice stone, 0.055 × 0.035 m.

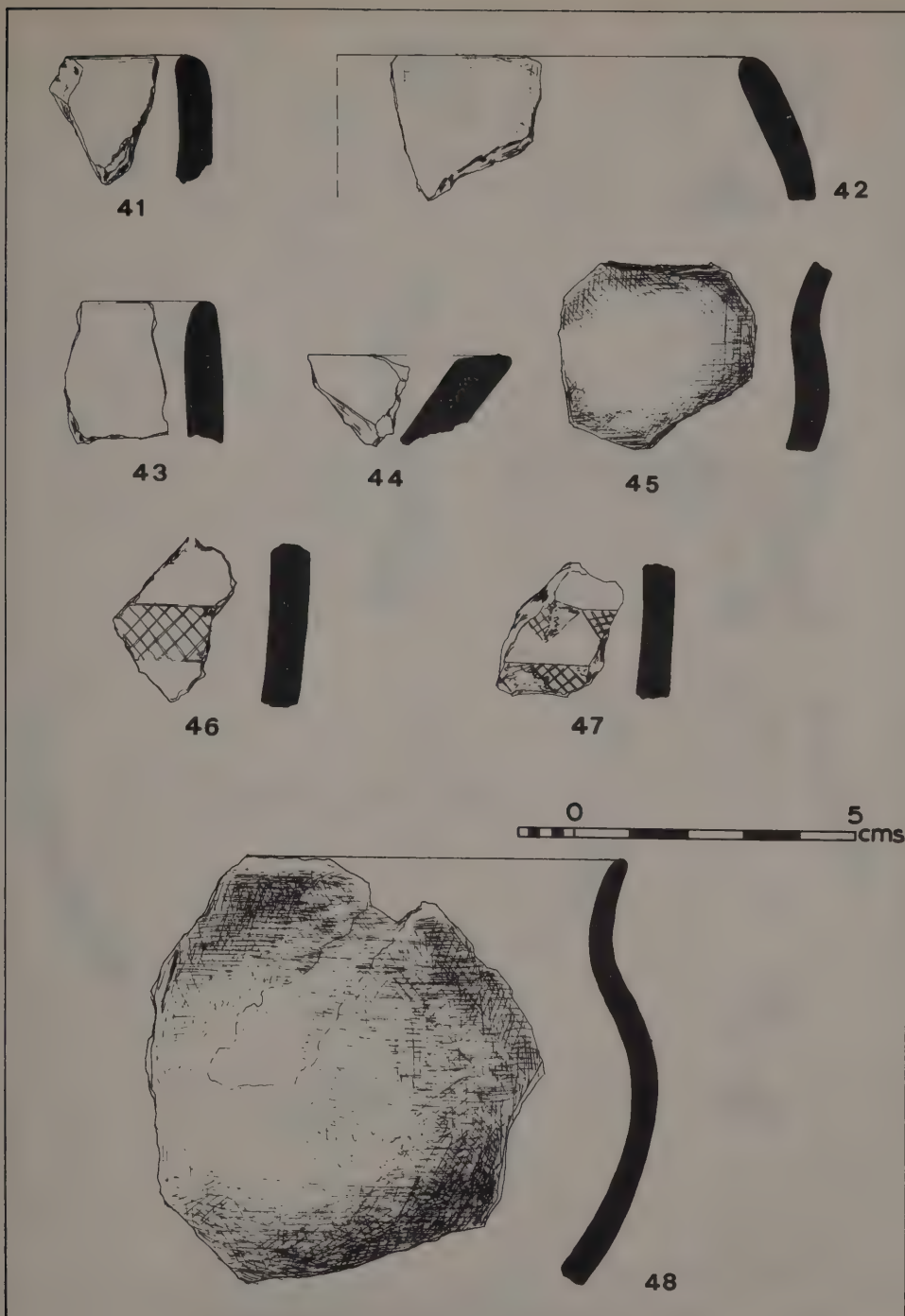
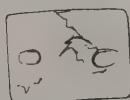


Fig. 10 Pottery from Quadrant 4 of Chamber.



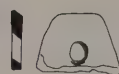
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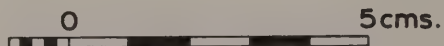
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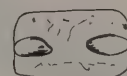
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Fig. 11 Pyramidal buttons from Quadrant 4 of Chamber.

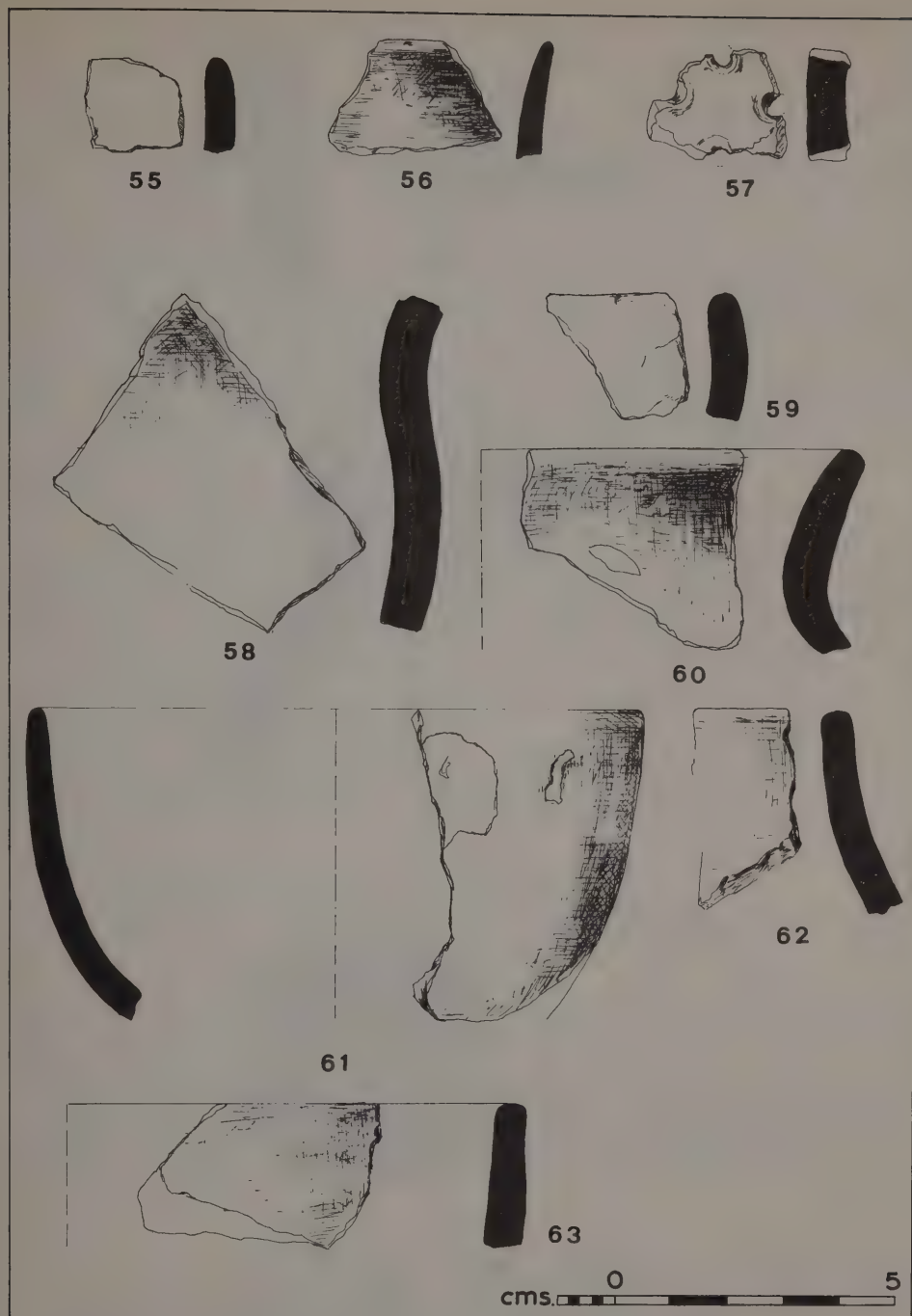


fig. 12 Pottery from various parts of the tomb.

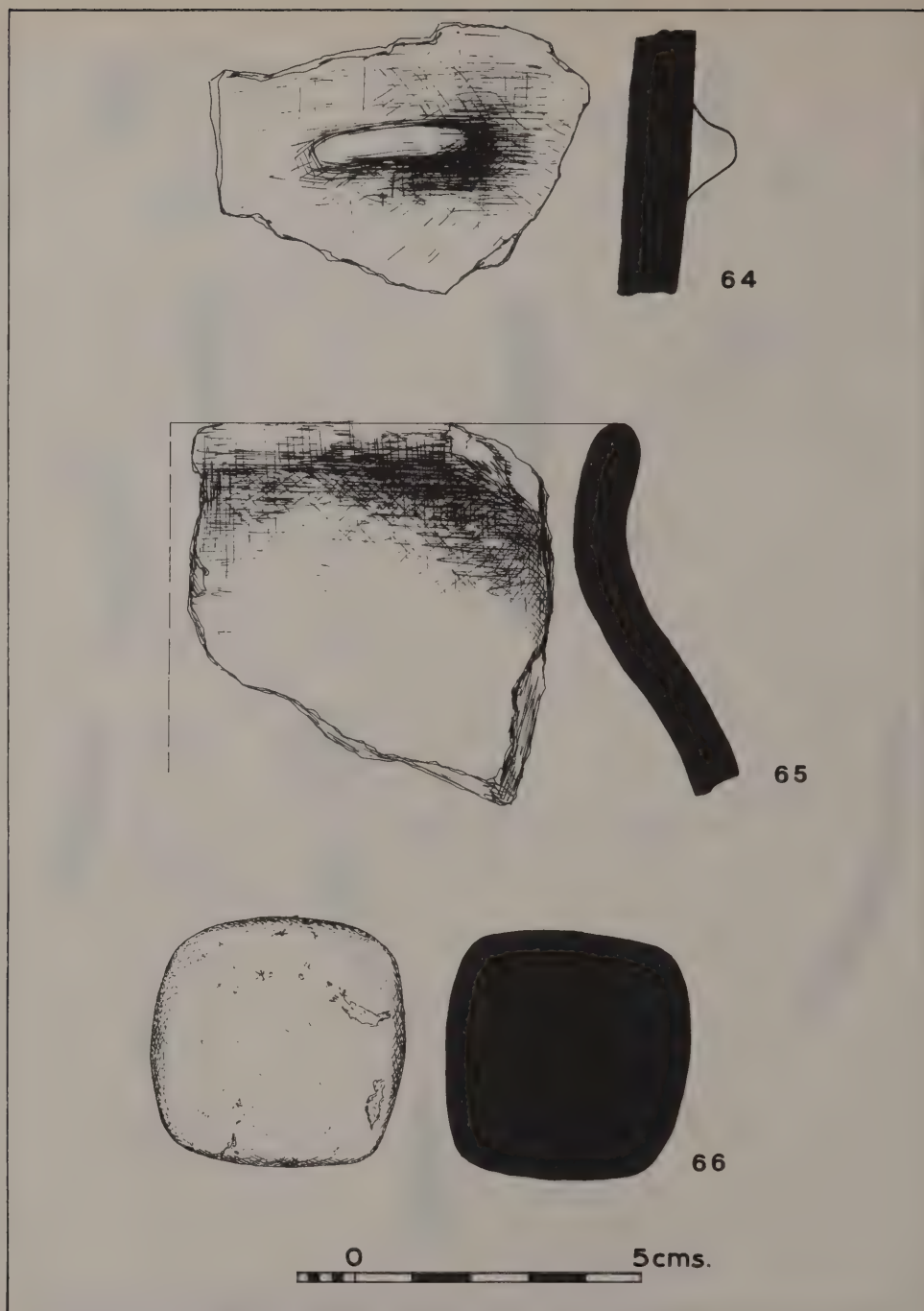


Fig. 13 Pottery and stone from the surrounding area.

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Bone and shell

Beads

FROM QUADRANT 2 OF CHAMBER (Fig. 8)

- Nos. 24 and 25 Two disc-beads with transverse perforation pierced from both ends. Height: 0.002 m.; diam.: 0.005 m.

V-perforated 'buttons'

FROM QUADRANT 1 OF CHAMBER (Fig. 5)

- No. 4 Button of triangular section with thick walls and V-perforation in very fragmentary condition; part of the lower portion is missing. Of bone. Height: 0.013 m., length of base: 0.020 m., width of base: 0.013 m.
No. 5 Button of triangular section and base with a transverse groove, in very poor state of preservation. Of bone. Height: 0.010 m., length: 0.021 m., width: 0.016 m.
No. 6 Button of pyramidal shape and rectangular base with blunted sides and most probably a V-perforation though its fragmentary state makes precision impossible. Of bone. Height: 0.016 m., length: 0.029 m., width: 0.009 m.

FROM QUADRANT 2 OF CHAMBER (Figs. 7 and 8)

- No. 18 Triangular button with rectangular base and V-perforation. Of bone. Height: 0.019 m., length: 0.023 m., width: 0.008 m.
No. 19 Pyramidal button with square base and blunt-angled sides and a V-perforation. Made from a pig's tusk. Height: 0.010 m., length: 0.019 m., width: 0.017 m.
No. 20 Identical to above. Height: 0.007 m., length: 0.017 m., width: 0.017 m.
No. 21 Button of triangular section and rectangular base and V-perforation. Crudely fashioned from a pig's tusk. Height: 0.010 m., length: 0.013 m., width: 0.010 m.
No. 22 Pyramidal button with square base and V-perforation. Perhaps of shell. Height: 0.004 m., length: 0.014 m., width: 0.013 m.
No. 23 Similar to above. Height: 0.005 m., length: 0.013 m., width: 0.011 m.

FROM QUADRANT 4 OF CHAMBER (Fig. 11)

- No. 49 Pyramidal button with rectangular base and V-perforation. Fashioned from a pig's tusk. Height: 0.010 m., length: 0.020 m., width: 0.015 m.
No. 50 Similar to above but made of bone. Height: 0.007 m., length: 0.012 m., width: 0.013 m.
No. 51 Of similar shape to nos. 49 and 50. Of bone. Height: 0.007 m., length: 0.014 m., width: 0.009 m.
No. 52 Portion of a pyramidal button probably with a square base and V-perforation in a very poor state of preservation. Of bone. Width: 0.013 m.
No. 53 Minute fragment of a button containing a perforation. Of bone.
No. 54 Pyramidal button with rectangular base and V-perforation. Of bone. Height: 0.008 m., length: 0.019 m., width: 0.012 m.

The human skeletal remains have not yet been examined by an anatomical expert. There would seem to have been at least four inhumations of individuals of varying ages contained within the chamber.

It must also be noted that numerous shells — mainly limpets — were found on the site, both inside the chamber and passage and also distributed over the surrounding area. Since they have not been studied by a conchologist it is impossible to determine their age or to suggest the purpose of their presence.

General considerations on the pottery

Not one whole vessel was found at Ca Na Costa. Most of the sherds are small, indeed, many are minute.

The line-drawings are the work of Luis Plantalamor, based on his knowledge and experience of these plain Pre-Talayotic wares. The best recent synthesis of these pottery shapes is his publication on the materials from Son Maiol in Mallorca (Plantalamor, 1974: Figs. 1 and 2).

Discarding modern intrusions, the following description covers roughly 25% of the sherds recovered from Ca Na Costa. Only rim-fragments and a few body ones presenting unusual features have been drawn and included in the inventory.

It is regrettable that there was neither time nor possibility of obtaining a specialist's detailed report. All the sherds are portions of hand-made pots which were probably mostly fired in an open kiln. Some are extremely well-fired at a fairly high temperature. The majority appear to have been fashioned from a grey micaceous clay of unknown provenance, are finely and evenly tempered and have a scaly core-texture. The abundant grits include crushed shell, quartz and other rock particles.

All the finds from Ca Na Costa are currently lodged in Ibiza Archaeological Museum since there is as yet no museum on Formentera.

The relative abundance of globular shapes with either straight or everted differentiated neck is notable. All the pots are of small size — a characteristic feature of burial sites. Many bowls, either incurved or straight-necked, are represented but shallow bowls are altogether absent. There are also a few flattened flower-pot forms with horizontal or nipple lugs but no carinated shapes except, possibly, nos. 35 and 36 (though this is very problematical owing to the absence of characteristic fragments).

Taking an overall view, the pottery from Ca Na Costa can be related to the Eneolithic and Early Bronze Age Culture with obvious parallels at Los Millares, early levels of El Argar and other south-western cultures of the Iberian Peninsula, with the Eneolithic Early Bronze Age layers of Arene Candide and other sites in southern Italy (such as Paestum).

The pottery known in Mallorca as Incised Ware Group A — found, for instance, at Sa Cova des Bous and later in abundance at Son Matge and Ca Na Cotxera, is clearly related to that of Ca Na Costa — due to the geographical proximity of the two islands.

Likewise the two sherds of flattened flower-pot shape, both with side-lugs, provide a dating element. It has been proved from numerous Mallorcan excavations that this pottery-form no longer exists after the 16th century BC. This fact is corroborated by some burial sites in Menorca.

Awaiting confirmation from future excavations we may cautiously relate the pottery from Ca Na Costa to the new material from Es Cuyeram in the neighbouring island of Ibiza, although they differ both in texture and shapes. Both could be included within the Early Bronze Age, perhaps a little later than the sherds recently found in the caves of Sa Mola in Formentera. This site yielded pottery somewhat similar to that of Ca Na Costa (though of larger-sized pots and lacking flower-pot shapes and incised wares). This would appear to postulate a later date and to indicate a habitation rather than a burial site.

IV. Discussion

The fortuitous discovery in 1974 of the megalithic passage-grave of Ca Na Costa on the small Balearic island of Formentera was indeed an unexpected archaeological event.

It had long been an established axiom that the megalithic movement *sensu stricto* had by-passed the Balearic Archipelago during its initial impetus (Fergusson, 1872: 436). Both Spanish and British prehistorians had endorsed this view (Garcia y Bellido, 1952: 339; Almagro Basch, 1960: 656; Childe, 1957: 263–4; and Daniel, 1958: 87). Only Macabich (1966: 6) obstinately, although then groundlessly, refused to accept the lack of population on Ibiza and Formentera prior to the Carthaginian colonisation. Both British authors cited considered that the normal form of prehistoric burial was the rock-cut tomb in Mallorca and the naveta in Menorca and both stressed the scarcity of early material in those islands. The controversial sherd of Beaker ware from the rock-cut tomb of Felanitx and V-perforated bone button from Son Mulet were then the only pointers to prehistoric trade or foreign contacts. Both Ibiza and Formentera, as well as the other smaller islands of the archipelago, were thought to have been uninhabited, or extremely scarcely populated, during the prehistoric period.

Since then — thanks to the activities of enthusiastic local archaeologists — the picture has dramatically altered. Pericot (1972), in his synthesis of the Balearic Islands, sums up most of the recent developments. One of the most important is the division of Balearic archaeology into Pre-Talayotic, Talayotic and Post-Talayotic phases. This most constructive innovation is now in current use and has advantageously replaced the old system advocated by Maluquer and quoted by Daniel (1958: 87) which only distinguished two periods, the Argaric and the Talayotic.

Beaker ware is still extremely scarce but its absence is compensated by the presence of incised ware of corresponding chronological date. At present it is still somewhat uncertain as to whether these two wares represent chorological as well as chronological groupings.

In 1975 the single V-perforated bone button found by Hemp at Cala Sant Vicens in the late 1920s has indeed multiplied. To quote but two instances, we now have the 14 from Son Matge and the 13 from Ca Na Costa. Their presence on many other sites will be discussed at a later stage and they now form an established feature of the Pre-Talayotic Culture.

Most important of all are the C_{14} dates from Son Gallard and Ca Na Cotxera. These sites have respectively yielded dates of 1840 ± 80 bc (Y-1789) and 1800 ± 100 bc (L-5515). Evidence of yet earlier human activities is provided by the C_{14} date of 3800 ± 115 bc (I-5516) in level 34 of cutting 3 at Son Matge (Rosselló-Bordoy and Waldren, 1973: 18) which agrees well with that of 3984 ± 109 bc (KBN-640C) from the cave of Sa Muleta (Rosselló-Bordoy, Waldren and Kopper, 1967: 6). Thus Daniel's prophecy (1958: 88) concerning the possible existence of a pre-Argaric phase in the Balearics has been realised.

It seems necessary to stress here that the Balearic archipelago consists of four major and many minor islands. To the majority, the name 'Balearics' usually means only Mallorca and Menorca; Ibiza, Formentera and the smaller islands are shadowy (or even unknown) entities. Yet the four major ones are sufficiently close to be visible one from another on clear days. So it seems only logical that they should have formed a more or less related whole in the days of early navigation in the Western Mediterranean.

Scientific archaeological exploration and excavation had until recently been confined — and fairly sporadically at that — to the two larger islands, in particular to Mallorca, where, as summarised by Pericot (1972), great progress has taken place. Menorca is, so far, much less developed; many of its prehistoric sites are, fortunately, either inland or fairly inaccessible. The prospect there is bright and promising albeit still in its initial stages. Future work in Menorca may well throw new light on the relationship between Pre-Talayotic burials, navetas and talayots and even perhaps on that existing between passage and gallery graves. Pericot (1972: 88) comments on the presence of dolmens (megalithic tombs) in the two larger islands though he considers them as not only scarce but of evolved forms. The ugly word 'dolmen' in Iberian terminology still covers a multitude of megaliths of very varied morphology and distinct periods.

Ibiza and Formentera — the Pityussae sub-group of the archipelago — have not as yet caught up with the prehistoric archaeological activities of the two major islands. As recently as 1972 Pericot (although he mentions the discovery at Portusálé in 1906 of crouched skeletons and pots, now all destroyed) could still state: 'It is difficult to account for the complete absence of Neolithic or Early Bronze Age on Ibiza and Formentera, but the fact remains that they are not found.' (Pericot, 1972: 114)

Up to the present these two islands had provided very few traces of human habitation prior to Carthaginian colonisation. The sherds found by Vives Esudero in the lower levels of the cave of Es Cuyeram (Vives Escudero, 1917: 2–4) and the objects in Ibiza museum (probably part of a small founder's hoard) recently published (Fernandez, 1974) so far constituted the only proofs of prehistoric human activities. A further find of eight bronze axes, four flat and four socketed, discovered years ago and now in a private collection, reinforced the possibility that Formentera was inhabited earlier than had previously been believed.

There seems little doubt that future prospection and excavation will fill the blank at present existing in Ibiza for the pre-Carthaginian period.

The discovery of Ca Na Costa on Formentera in 1974 now proves beyond all doubt that the Pityussae were inhabited during the Pre-Talayotic period. At present it constitutes a *rara avis*, both in itself and in its context, as unique and unusual as is Son Bauló de Dalt in Mallorca (Rosselló-Bordoy, 1963: 21).

Ca Na Costa is a classic example of the simple orthostatic passage-grave of Pavian plan. According to the new typology proposed by Ruiz Solanes at the Jaen Archaeological Congress of 1971 it conforms to his Fig. 1, no. 12 (Ruiz Solanes, 1973: 208). It is simple since it lacks all elaborations such as forecourt, ante-chamber, side-chambers, niches, septal stones and art.

There were no traces whatsoever of tumulus, cairn, adjacent fallen or broken cover-stones nor dry-stone wall courses. A possible method of roofing might well have been the one still currently used for the cattle-shelters. These structures are common features of the Balearic landscape; their roofs consist of beams, branches, stones and compacted clay and, occasionally, layers of seaweed and charcoal. The area of these shelters corresponds roughly to that of Ca Na Costa and this hypothetical covering method seems fairly plausible. The disturbed state of the chamber precluded any remaining traces of pillar or postholes and the fallen stones in quadrants 3 and 4 provide the only possible confirmation of the theory. These, however, might conceivably equate with the remains of a stone pavement between burial layers such as that of tomb 2 at Texugo (Elvas), mentioned by Schubart (1973: 188) and also found in other passage-graves like Le Dehus. The fact that human bones and some of the V-perforated buttons came from beneath these flags in quadrants 3 and 4 at Ca Na Costa reinforces this possibility.

Beams could easily have fitted in the interstices of the chamber orthostats. Formentera, like most Mediterranean islands, would have been far better wooded in days prior to the widespread depredations caused by man and goats. The spaces between the beams would be filled in by branches on which were laid stones and the whole then covered with a sloping layer of compact earth and clay. Some of the Mallorca navetas, for instance Alemany, were roofed in this manner (Enseñat Enseñat, 1971: 72).

Daniel's remarks on the possibly extensive use of perishable materials such as wood in the construction of megalithic tombs (Daniel, 1958: 35) would appear to have a direct bearing on the speculative roofage of Ca Na Costa, especially so at the period of the climatic optimum of the Early Bronze Age.

Retaining walls, platforms and porthole stones are all features common to passage-graves in numerous instances and contexts, ranging from Iberia to Ireland.

All occur at Los Millares (Almagro and Arribas, 1963) in particular and are far too widely distributed to be discussed here in detail. An interesting point is the presence of porthole entrances in many Menorcan navetas — a proof perhaps of the survival of a long-established tradition in an insular context.

Grooves cut into the rock floor of the chamber to act as sockets for the uprights are also fairly common in Iberia. Esteva Cruañas (1965: 47), for instance, mentions them when discussing the passage-graves of the Gerona region.

But, although so typical in plan and though sharing many common features with countless other passage-graves, Ca Na Costa has peculiarities which make it impossible to provide an exact analogy. Its sturdy radial buttresses alone serve to distinguish it from any other tomb of its type known to the writers. The only possible parallel to them are the buttresses of Millares I but these are of dry-stone masonry as opposed to the massive stone slabs of Ca Na Costa. Despite helpful research from many quarters no one has yet been able to quote an analogy for these radials which played a very important functional part in Ca Na Costa's construction.

Thus, radials apart, Ca Na Costa is undoubtedly a passage-grave of entirely European tradition which would be quite at home in Iberia, Brittany or Ireland. Despite the

proximity of North Africa we must discard all likelihood of any influence from that region, especially in view of the great uncertainty of North African megalithic dating.

Although relatively close in space to the Almerian passage-graves Ca Na Costa shares few common traits with them apart from retaining walls, platform and porthole entrance. The seven sturdy orthostats forming its chamber are of a strictly functional nature — as opposed to the slender slate slabs which, at Los Millares, merely act as an inner facing. At this latter site there are usually three porthole slabs between entrance and chamber, as well as side-chambers and niches in many of the tombs and all were originally covered by a tumulus.

It is further to the west, south and north that we might look for the prototypes of Ca Na Costa. If we examine the Portuguese passage-graves of the Alentejo region (whose distribution follows the course of the Tagus and its tributaries) and others which spread eastwards following the course of the Guadiana, we find fairly close analogies for Ca Na Costa. In an unpublished thesis on the passage-graves of Salamanca province Lopez Plaza (Salamanca, 1972) derives these from their Alentejo prototypes, also making allowance for a possible tholos influence from the South of the Peninsula. She considers the Salamanca region as marking the northernmost limit of the extension of these graves having a circular orthostatic chamber and long passage, such as Gejuelo del Barro whose passage is 6.9 m. long and 1 m. wide but whose circular chamber of 10 massive granite orthostats has almost the same diameter as that of Ca Na Costa (3.5 m.). Were it not for the great disparity of the passage lengths there exists a striking similarity between the two megaliths. In North Portugal and Galicia the passages are all shorter than the chamber diameter — as is the case at Ca Na Costa.

Other passage-graves whose passage-length and plan have much in common with Ca Na Costa are the Alentejo antas of Heredad de la Caeira, especially nos. 1, 5 and 7 (Correa, 1921) and those of Concelho de Reguengos, in particular nos. 32 and 83 (Leisner, 1951).

If we accept a South Portuguese origin for passage-graves there would be little difficulty in including Ca Na Costa in such a typological sequence and its short passage would seem to indicate a fairly late date in the series.

From farther north comes further support for placing Ca Na Costa in the later stages of an eastern extension of the megalithic movement. Maluquer (1965: 32) discusses the passage height of the tombs in the Alava region which he also derives from Portugal and attributes to the initial period of megalithic expansion in Iberia. He considers those tombs whose passage height is almost equal to that of the chamber to be early in the series whereas in the later examples the passage is much lower — as is the case at Ca Na Costa.

Pericot (1950: 40) lists passage-graves of the Alto Ampurdán, some of which (e.g. Font del Roura) have a plan and features similar to those of Ca Na Costa — for instance, the square porthole stone at Carmeniu.

Lilliu (1965: 87) stresses the close connection between the Midi and the Balearics and the probability of a strong direct influence from the South of France on both

Mallorca and Menorca during the Pre-Talayotic period. He considers the Pyrenean Provençal culture as an entity which spreads from those regions to the Balearics, Sardinia and Corsica during the course of the Chalcolithic and the Early Bronze Age, giving rise to an influence which persisted throughout the whole of the Bronze Age.

There does indeed seem to be much in favour of deriving Ca Na Costa from the Peninsula as the result of an eastward extension of the megalithic movement. But it must be borne in mind that Pericot (1950) favours a Near Eastern origin for the Catalan culture and there always exists the possibility that Ca Na Costa was built by people coming from that direction. This latter hypothesis appears far less plausible than the former and current archaeological thought, in Great Britain particularly, tends to discredit the 'Ex oriente lux' theory so popular in former times and to favour 'the probability of some independent development' (Chapman: 1975). The author of this quotation — in an unpublished Ph.D. Cambridge thesis — sums up the latest development of the views so pungently expressed by Renfrew concerning the likelihood of an independent local origin for the Iberian megalithic tombs.

The finds from Ca Na Costa are of little help towards the elucidation of its origin and time-context. Not one entire vessel was found on the site, only small and mostly amorphous sherds of many different periods.

Of the plain early wares belonging to recognisable forms many are already familiar from Pre-Talayotic sites. Flower-pot shapes of Horgen type (known in Spanish terminology as 'truncocónico' and considered to be early at such sites as Alemany) (Rosselló-Bordoy, 1973: 299), carinated vessels ('bitruncocónico'), globular shapes and bowls are all present at Ca Na Costa. The wares are as varied as the forms: thin and thick-walled, well and poorly-fired, burnished, smoothed or rough, fine or coarse-gritted, etc. The rim-shapes also are various, being either straight, inturned or everted. Both the lugs (one of nipple and the other of thumb-grip type) are usually considered early in date. All the sherds, in fact, are common to the Pre-Talayotic periods in both Mallorca and Menorca and belong in time to the first half of the 2nd millennium BC.

The association of the plain Pre-Talayotic wares with incised ones is by now well-established in the Balearics (Rosselló-Bordoy, 1973: 38). This writer was the first to classify these wares and distinguish them from Beaker sherds (Rosselló-Bordoy, 1960: 300–15) — though Enseñat Estrany (1951: 123–6) had already done pioneer work along the same lines. As the former remarks (Rosselló-Bordoy, 1973: 38) the problem posed by incised ware is the most interesting one of recent years concerning Balearic archaeology. Pericot (1972: 36) also considers this ware an important element of the Pre-Talayotic period and asserts that in that context it is certainly contemporary with Beakers. On the other hand, Bosch Gimpera (1965: 26) considers incised ware in general as being far earlier and places its Iberian origin in the Cave Culture from which he derives the Beaker Culture. Cantarellas Camps (1972) has published the most recent synthesis and discussion of this incised ware in Mallorcan contexts and considers it as contemporary with Beakers though representing a different concept and culture (Cantarellas

Camps, 1972: 79). There is, so far, no evidence of any association between incised ware and traces of metallurgy. Both Rosselló-Bordoy and Cantarellas Camps stress the Western Mediterranean profusion and diffusion of incised ware and suggest possible influence from Arene Candide, Sardinia and Sicily — as well as from Central Spain — on the Balearics and both see it as rooted in an ancient Neolithic tradition.

Asquerino Fernandez (1973: 149) has proposed the term 'impressed' instead of 'cardial' for those wares which persist on sites such as Chateaufort-les-Martigues and Cueva de la Sarsa long after the Neolithic. The two minute sherds from Ca Na Costa have very similar decoration to those of her Plate I, nos. 4 and 6, and all could well stem from a common inspiration.

The chief interest of the sherds from Formentera is the fact that, up to now, this incised ware has usually only appeared in natural cave contexts as opposed to artificially made tombs. The best-known exception is the single sherd from Son Sunyer 7, found in 1962 in a dubious Early Bronze Age context (Rosselló-Bordoy, 1962: 33–4).

The two tiny bone disc beads are utterly typical and similar to countless others appearing in early contexts.

The worked and polished stone (no. 66) could perhaps possibly be related to those found at Cotaina together with human bones, globular and 'archaic' sherds, a bone point and bronze artefacts. At Ca Na Costa it occurred well outside the chamber and probably has no other significance beyond its rarity.

Not a flake of flint nor a scrap of metal were found on the site and the only remaining artefacts to discuss are the 13 V-perforated buttons.

These are mostly made of bone and the majority are pyramidal in shape. This, according to Arnal, would tend to place them somewhat late in the series since he considers this shape as a sub-division of the prismatic form (Arnal, 1954: 255–308). Pericot (1972) tends to agree with Arnal's views on this matter. The latest catalogue of these artefacts is that compiled by Veny (1974: 122–5). He lists the sites where they have occurred in the Balearics and notes their occasional association with incised ware. At Ca Na Costa four of the V-perforated objects are of triangular section (which shape also is thought to be late in the series).

Arnal's article reminds us that these V-perforated 'buttons' have a wide spatial distribution: they are found in multiple contexts from the Mediterranean to the Baltic. But he considers them to enjoy only a short duration in time. According to him they only have one common factor which is their limited existence during the first half of the 2nd millennium BC.

Both Arnal and Pericot stress the profusion of these artefacts in the Pyrenean region (which the former writer considers as their place of origin). This applies especially to those of prismatic shape. Some Almerian specimens — for instance those from Lugarico Viejo and Gatas — are pyramidal and the ones from La Jquera in Castellón include both prismatic and pyramidal forms. This perhaps provides yet another slender pointer towards a western origin for Ca Na Costa.

Despite Arnal's insistence on the short life-span of these V-perforated objects it

must be remembered that they enjoyed a long floruit – especially so in isolated insular regions. They are found in Talayotic contexts both in Mallorca and Menorca (Vený, 1974). The conical baked clay buttons with transverse perforations from Son Oms (Rosselló-Bordoy, 1973: 299) and the bronze V-perforated pyramidal one from the fourth layer of Els Tudons (Vený, 1974: 111) surely mark the end of the sequence and illustrate the long survival of traditional objects or heirlooms in such contexts.

Ca Na Costa, with its 13 whole and two fragmentary V-perforated buttons, now adds another dot to the distribution map of these objects.

We conclude that all the finds from Ca Na Costa would logically fit within a chronological horizon bounded respectively by the Ozieri and the Bunnanaro cultures of Sardinia, i.e. between 2000 and 1600 BC.

It is hard to account for the presence of a passage-grave on the small Western Mediterranean island of Formentera and *a fortiori* so for one such as Ca Na Costa with its careful construction and aberrant radials. It is quite impossible to visualise it as built by either shipwrecked or transient mariners since it argues the existence of a settled and organised community. Until further excavation throws more light on the matter it presents a puzzling phenomenon and poses the problem as to how and why its builders lived on Formentera some 4,000 years ago. 'This flat, low-lying island with swampy coastlands' (Pericot, 1972: 15) lacks many of the attractions to prehistoric man offered by its larger sisters. It possesses neither good lithic material for artefacts nor metal ores. It is not only smaller but also less well-wooded and watered than the other three major islands. Even during a climatic optimum there would be little timber available and even less water (a present-day perennial problem). Despite the widely-held (but probably erroneous) belief that in Roman times the island's name was Frumentera (another proposed etymology is Promontoria) agriculture has never played a prominent part in the economy of the island. Nor could hunting ever have amounted to much in so small a place at any period and pasture on any extensive scale would have proved difficult.

However, Formentera would undoubtedly have provided an adequate habitat for a restricted number of people in search of a new home. Rainwater could have been stored then (as now), a few crops grown and sheep and goats pastured in limited numbers. The economy, as nowadays, would have relied extensively on fishing. Though it has not proved possible to obtain a report on the many sea-shells found at Ca Na Costa their presence must be noted here. The island has one good harbour (La Sabina) and various other small bays. Above all else Formentera is an excellent centre of salt-production and this alone would have provided an incentive to potential settlers, even at such an early period. The exportation of salt has always been a very important factor in the economy of both Ibiza and Formentera.

The island's geographical position might also have influenced its settlement in early times. Formentera lies almost on the same latitude as Sicily, Southern Sardinia and Cape Nao and so would have provided a good landfall for ships sailing either east or west. All these regions have a long tradition of both impressed and plain wares matching those

found at Ca Na Costa — though not of passage-graves. The island would have proved an admirable focal-point for new settlers coming either from the Peninsula or islands to the east who combined an incised ware tradition with passage-grave building techniques around the beginning of the 2nd millennium BC.

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Abstract

The excavation of the orthostatic passage-grave of Ca Na Costa on Formentera in 1975 has added some 1,500 years to the pre-history of the Pityussae group of the Balearics. The tomb is of circular Pavian plan: the chamber (diameter c. 4 m.) consists of seven large uprights (average height 2 m.) of local Miocene limestone and the passage of four smaller ones. There were two retaining walls, a platform, a porthole entrance to the chamber and originally 24 solid radial buttresses but no remains of any cover. It seems plausible to derive it from the Peninsula though always allowing for possible influence from eastern islands. Its morphology and finds of plain Pre-Talayotic and incised wares and V-perforated buttons tend to suggest a late date in the passage-grave sequence, somewhere between the Ozieri and Bunnanaro cultures, within the first half of the 2nd millennium BC.

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Pre-Roman coinage on the territory of modern Yugoslavia

by ZDENKA DUKAT and IVAN MIRNIK

Introduction

Here, for the first time, an attempt has been made to give the English-speaking reader a short survey of the coinage which was in circulation in the Northern Balkans before the Roman occupation. This coinage, manifold in its structure, has been the subject of a very large number of articles and papers scattered in many books and periodicals, mainly inaccessible. Another problem is the language barrier, for the major part of the articles mentioned have been published in the Serbo-Croatian, Albanian, Slovene, or Macedonian language and only a relatively few of them have a brief summary in English, German, French, or Italian attached to them. The Albanian literature is, in spite of its quantity and importance, nearly unknown to the western world. In order to bring order to this relative chaos in the literature, an up-to-date bibliography has been added to this article, including not only the more important and recent works, but also most of the early literature dealing with this coinage. This bibliography can direct the reader and enable the numismatist to continue his studies in the desired direction. So far there has been no specific bibliography dealing with the Graeco-Illyrian and Celto-Barbarous coinages, as such works have always been incorporated in more general bibliographies. We have the excellent bibliography of treatises and articles on Yugoslav history and archaeology, published by the Yugoslav Lexicographical Institute in Zagreb (Bibliography of Bibliographies, No. 1) and the valuable *Bibliographia Illyrica* (4, 5), dealing with the Illyrians in general. Albanian history and archaeology are represented by another bibliography (2, 3).

It is a very difficult task to try to give a general idea about the pre-Roman coinage of such a large and historically divided territory as modern Yugoslavia is, and especially within so limited a space. Yugoslavia, as is generally known, covers nearly the entire ancient Ἰλλυρίς, *Illyricum*, approximately the later Roman province of *Dalmatia*. It also covers *Histria*, which once formed part of the *Regio X Italica*; *Liburnia* along the Adriatic coast; further on, a part of *Noricum*; large territories of the Pannonian Plain and parts of *Moesia* and *Macedonia* as well. Therefore the modern boundaries are in this article in order to limit the space in a certain manner — although some excursions will have to be made outside this area; the chronological limit being the Roman conquest in the 2nd and 1st centuries BC and the end of local emissions of independent cities, rulers and tribes.

When one speaks of pre-Roman coinage in Yugoslavia, one must draw a clear line between the emissions of the Greek cities, Illyrian cities, tribes and rulers all along the Adriatic coast, and the barbarous coinage, usually referred to as Celtic, in the north of the country. These coins do not only differ in style and execution, but also in material. From what has survived to our times, bronze dominates on the coast, with some silver, while in the interior silver predominates and gold and bronze occur only in smaller quantities. Sometimes the chronological sequence also differs – the coins from the coastal mints are much older, starting with the 4th century BC, while the main barbarous types were minted between c. 150 and 50 BC.

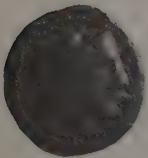
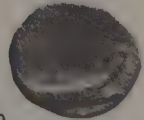
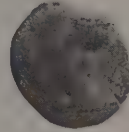
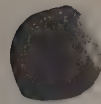
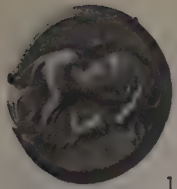
It may also be worth mentioning that all the illustrative material in the plates is chosen from the numismatic collection of the Archaeological Museum in Zagreb, which is together with the collections in Split, Belgrade and Osijek, among the best in this part of Europe.

The Graeco-Illyrian coinage

Let us first take a closer look upon the coinage of the Illyrian coastland. After Eckhel, one of the first western scholars, apart from some local historians and archaeologists, who took an interest in the Graeco-Illyrian coinage, was Sir Arthur Evans (Bibliography No. 38) who published a few interesting coins in 1880. His collection, acquired mainly in Dalmatia, Bosnia and Hercegovina and Kosovo around 1880, and now kept at the Ashmolean Museum in Oxford, is among the best in the world. A few years later such coins were described in one of the British Museum catalogues (44a). They were also discussed by Don Šime Ljubić (1822–96) in the second half of the 19th century (78–82), but the major contribution was made by Professor Josip Brunšmid (1858–1929), the director of the Archaeological Department of the Croatian National Museum in Zagreb (now the Archaeological Museum) and Professor of Ancient Archaeology at the Philosophical Faculty of the University of Zagreb. His dissertation, under the title *Inscripfen und Münzen der griechischen Städte Dalmatiens* was published in Vienna in 1898 (12). This work still remains the fundamental study of the coins in question and has been unsurpassed ever since, very little having happened to alter its main structure,

Plate I Graeco-Illyrian coinage:

1. Dyrrhachion, tridrachm, AR, 23.50 mm., 10.63 gr., Archaeological Museum Zagreb, Inventory Nr.2246; ancient Museum collection; 2. Dyrrhachion, king Monounios, c. 280 BC, stater-tridrachm, AR, 21.20 mm., 10.35 gr., Nr.6206; Ratto Cat. Genova 1909; 3. Dyrrhachion, drachm, AR, 18.0 × 19.0 mm., 3.20 gr., Nr.6207; ancient Museum collection; 4. Dyrrhachion?, king Mytilos, c. 270 BC, AE, 13.0 × 14.0 mm., 1.83 gr., Nr.2809; found at Stari Grad, Hvar; 5. Dyrrhachion, AE, 15 mm., 3.0 gr., Nr.2284; coll. Lukešić-Simić, purchased in 1898; 6. Apollonia, AR, drachm, 19.0 mm., 3.30 gr., Nr.2175; ancient Museum collection; 7. Damastion, tetradrachm, AR, 20.0 × 23.0 mm., 13.55 gr., Nr.8862; ancient museum collection; 8. Damastiön, tetradrachm, AR, 22.5 mm., 13.55 gr., Nr.8861; ancient Museum collection; 9. Damastion, drachm, AR, 17.0 mm., 2.5 gr., Nr.5236; M. Turić Skoplje, purchased in 1907; 10. Skodra, king Genthios, AE, 16.0 × 18.0 mm., 4.40 gr., worn. Nr.2303; Baron M. Turković, exchange in 1899; 11. Skodra, autonomy, AE, 17.0 × 19.0 mm., 4.0 gr., Nr.2305; Baron M. Turković, exchange in 1899; 12. Herakleia, AE, 25.0 mm., 16.5 gr., Nr.2309; found at Hvar; 13. Herakleia, AE, 21 mm., 6.52 gr., Nr.2817; found at Hvar; 14. Herakleia, AE, 17.0 mm., 3.80 gr; found at Hvar; 15. DI, overstrike, AE, 27.0 mm., 13.4 gr., Nr.2657; 16. DI, overstrike, AE, 24.0 × 26.5 mm., 13.5 gr., Nr.2653.



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although one might wish for a new edition, brought up to date. Among other scholars dealing with the same subject one must not forget K. Patsch (106–12), W. Kubitschek (68), A. Maier (84), R. Münsterberg (95–7), G. Novak (102), J. M. F. May (89–91), K. Pink (121), D. Rendić-Miočević (130–9a), F. Scheiger (141), P. R. Franke (41), and last, but not least, our Albanian colleagues H. Ceka (20–32), S. Islami (53–6) and B. Jubani (58–60), who all have brought much light into this obscure part of numismatics which is still included in Greek numismatics.

The earliest Greek colonies were founded on Adriatic islands and on the mainland in the 7th century BC and this continued in the 4th–3rd century BC. Gradually emissions of their local coinage began to appear (Fig. 1), minted entirely for their trade with the Illyrians, not with Greek cities, because the quantity of Graeco-Illyrian coinage found on Greek sites is negligible (for instance see in: D. M. Robinson. *Excavations at Olynthus. Part VI. The Coins found at Olynthus in 1931*, Baltimore–London–Oxford 1933, Pl. XVII, 733). On the other hand this coinage reached the interior of the Balkans and currency of better quality can be found even in Pannonia. The Graeco-Illyrian coins bear all the characteristics of coins of Greek $\pi\omicron\lambda\epsilon\iota\varsigma$, mingled with a certain amount of Illyrian and Celtic influences. Coins were issued from the mints of the following cities, tribes and rulers (Fig. 1): *Herakleia* (Pl. 1: 12–14); *DI(M)* (Pl. 1: 15, 16); *Korkyra* (Pl. 2: 17); *Issa* (Pl. 2: 24–31); *Pharos* (Pl. 2: 18–23); *Rhizon*; *Apollonia* (Pl. 1: 6); *Dyrrhachion* (Pl. 1: 1–5); *Lissos*; *Skodra* (Pl. 6: 10, 11); *Damastion* (Pl. 1: 7–9), as well as some lesser mints in the south; the tribes *Daorsoi* and *Labeatai*; the kings *Monounios* (Pl. 1: 2); *Mytilos* (Pl. 1: 4); *Jonios* (?); *Genthios* (Pl. 1: 10) and *Ballaaios* (Pl. 2: 32–5). The main features of the so-called Graeco-Illyrian coinage are the following: the coins are small in size, sometimes in large denominations, struck in bronze, of rough craftsmanship in general, and, from the aesthetic point of view, sometimes rather ugly. Bronze has been preserved in larger quantities, silver is scarce, especially as one moves up the Illyrian coast. On the obverse there is usually the head of a deity, sometimes the ruler's head, whereas the reverse shows various attributes belonging to the deities on the obverse – for instance Heracles' club, bow and arrow (Pl. 1: 12, 13) – or it reminds us of the economy of the

Plate II Graeco-Illyrian coinage:

17. Korkyra, AE, 20.0 mm., 7.40 gr., Nr.2429; from Lumbarda, Korčula, F. Radić, purchased in 1896; 18. Pharos, AE, 24.0 mm., 17.20 gr., Nr.2444; 19. Pharos, AE, 19.0 mm., 7.02 gr., Nr.2473; 20. Pharos, AE, 17.0 × 18.0 mm., 5.90 gr., Nr.2454; from Stari Grad, Hvar; Coll. L. Bervaldi-Lucić, bought in 1901; 21. Pharos, AE, 15.0 × 16.0 mm., 3.0 gr., Nr.2875; from Hvar; 22. Pharos, AE, 11.0 mm., 1.5 gr., Nr.2542; from Hvar; 23. Pharos, AE, 18.0 × 19.0 mm., 6.02 gr., Nr.2555; Auction Walcher, Frankfurt, bought in 1901; 24. Issa, AE, 20.0 mm., 7.14 gr., Nr.2347; from Hvar; 25. Issa, AE, 19.0 × 20.0 mm., 5.33 gr., Nr.2353; 26. Issa, AE, 22.0 × 23.0 mm., 7.06 gr.; 27. Issa, AE, 18.5 × 19.5 mm., 5.30 gr., Nr.2395; 28. Issa, AE, 18.5 × 19.0 mm., 5.0 gr., Nr.2400; 29. Issa, AE, 19.0 × 20.5 mm., 5.74 gr., Nr.2406; Coll. Brunšmid, pres. 1899; 30. Issa, AE, 13.5 × 14.0 mm., 3.28 gr., Nr.2421; Coll. Brunšmid, pres. 1899; 31. Issa, AE, 17.0 × 19.0 mm., 6.60 gr., Nr.2416; 32. Rhizon, king Ballaios, AR (base), drachm, 15.0 × 18.0 mm., 2.60 gr., Nr.2678; ancient Museum collection; 33. Rhizon, king Ballaios, AR (base), drachm, 16.0 × 20.0 mm., 2.50 gr., Nr.2679; from Stari Grad; Coll. Lucić-Bervaldi, bought in 1901; 34. Rhizon, king Ballaios, AE, 16.0 mm., 2.35 gr., Nr.2677; ancient Museum collection; 35. Pharos, king Ballaios, AE, 15.0 mm., 2.5 gr., Nr.2674.

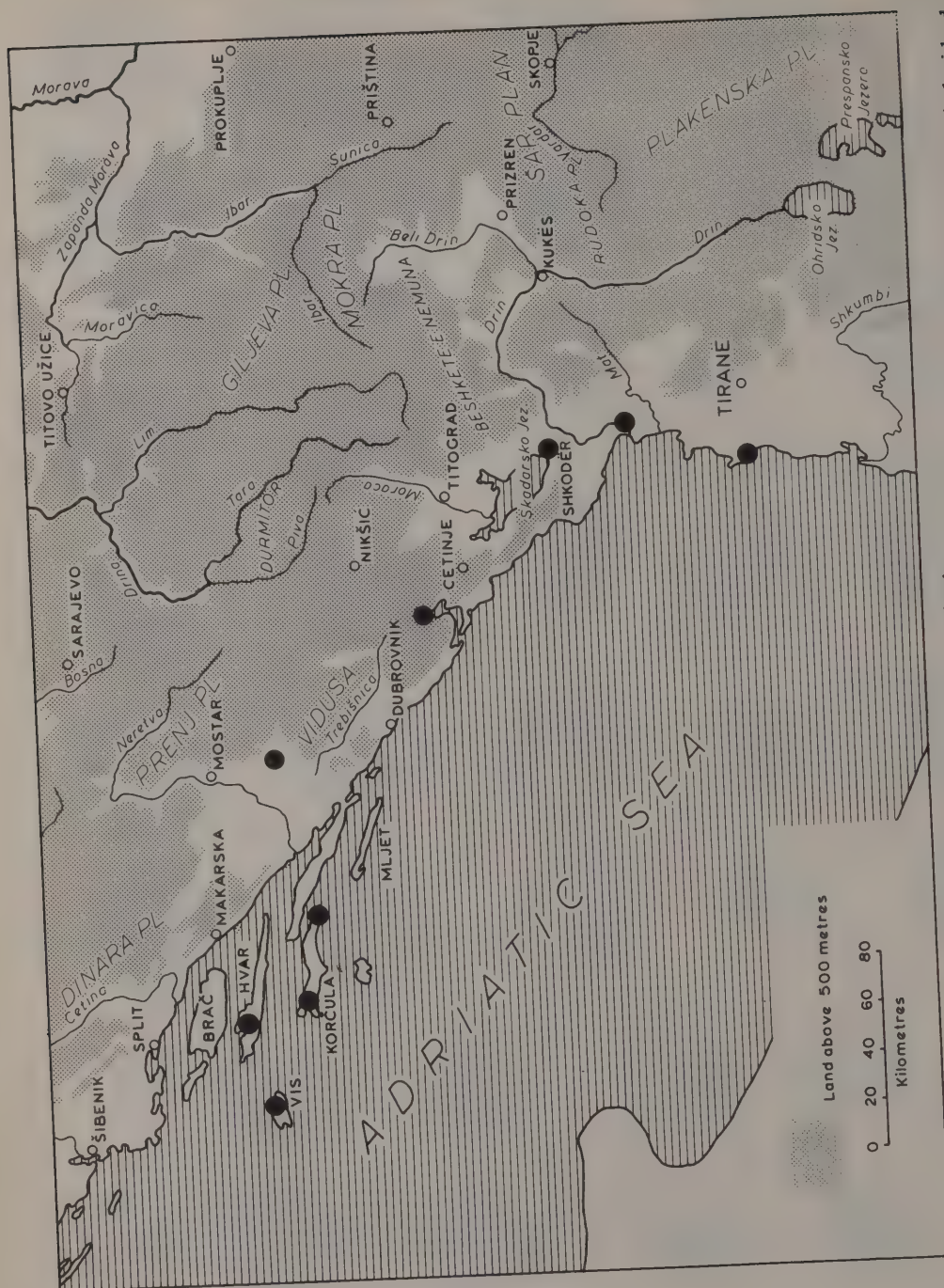


Fig. 1. Mints of Graeco-Illyrian coinage in South Dalmatia and North Albania. Black dots represent the following mints, by going from left to right: Issa (Vis, the island of Vis); Pharos (Stari Grad, the island near of Hvar); Herakleia? (Vela Luka, the island of Korčula); Korkyra? (Lumbarda, the island of Korčula); Daorski (Daorski near of Hvar); Rhizon (Risan in the Gulf of Kotor); Skodra (Skadar, Shkoder); Lissos (Lješ); Dyrrhachion (Drač, Durrës).

country: ears of corn (Pl. 2: 17), grapes (Pl. 2: 21, 29), kantharoi (Pl. 2: 23, 30, 31), kraters or amphorae (Pl. 2: 29); goats (Pl. 1: 15, 16; Pl. 2: 18–20, 22, 26), stags (Pl. 2: 27, 28), does, etc.; or the sea: waves, dolphins (Pl. 1: 14; Pl. 2: 24), galleys (Pl. 1: 10, 11). The cities are entirely Greek or Illyrian colonies, or both at the same time, as is proved by onomastic studies. Sometimes they enjoy full autonomy, but most of the time they exist under Illyrian, Macedonian, or Roman rule.

The most ancient among the Greek colonies on the eastern Adriatic shore were *Apollonia* and *Dyrrhachion* (*Epidamnus*), founded in the 6th and 7th centuries BC respectively, but we shall not discuss their interesting coinage in detail because the sites are situated in modern Albania. On the other hand, they cannot be omitted because of the extremely dense concentration of their coins, both in hoards and as individual finds, all along the coast and deep into the interior of the country. The coinage of both cities is well known and has been frequently analysed and dated (20, 21, 23–6, 29, 32, 36, 67, 84, 96, 108, 109, 111). The latest and best work has been written by H. Ceka (32). The coins of *Apollonia* and *Dyrrhachion* are also to be found in considerable quantities in the major numismatic collections. The main types of both cities, minted from the second half of the 5th century BC, are very similar: there is a cow with a suckling calf on the obverse, to the right or to the left, and the so-called *Alcinous* garden on the reverse bearing the abbreviated form of the genitive of the name of the town's inhabitants — *Απολ(λωνιτάν)* and *Δυρ(ραχινών)*, and a very extensive list of magistrates' names (H. Ceka, 32: 184–99). *Apollonia* and *Dyrrhachion* strike coins in silver — staters or tridrachms (Pl. 1: 1, 2), drachms (Pl. 1: 3, 6) and later on denars as well — and in bronze too, already from the 4th century BC (H. Ceka, 32: 57–66). Both mints stop working around the year 100 BC, or later, when they were closed down.

Other cities beyond the modern Yugoslav border were *Skodra*, to whose coinage, beginning in the 3rd century BC (52, 53, 55, 143) we shall return later in connection with the Illyrian king *Genthios*; *Lissos* (53, 55; Pl. 1: 10, 11), also starting to mint in the 3rd century BC, and *Damastion* whose site is still uncertain and whose coinage has been much discussed (42, 48, 89, 115, 118; Pl. 1: 7–9), especially by J. M. F. May (89).

Returning to Yugoslav territory, one finds that the oldest coins one knows of were issued by *Herakleia*, one of the 40 *Heracleias* known in the Greek World, mentioned by *Pseudo-Skylax* in the 4th century BC. The exact position of the site is still a problem — G. Novak places it at Rogoznica or at *Salona*, or even on Hvar, while D. Rendić-Miočević, not without strong reasons, thinks that it was situated on the island of Korčula. This mint issued considerable quantities of bronze coins with the head of young *Herakles* with lion's skin on the obverse and with the inscription ranging from HPA to HPAKΛE IOTAN and with *Herakles'* attributes on the reverse (Pl. 1: 12, 13). This type is the most frequent one. More rare is the second fundamental type with the head of *Artemis* on the obverse and the dolphin on the reverse (Pl. 1: 14). The denominations of *Herakleia* follow the Syracusan standards and there are three denominations: one unit (16 gr. average); its half (weight ranging from 6.52 to 8 gr. average), which is the most frequent; finally a double unit (weight c. 32 gr.) which is extremely rare. This *Herakleia* was possibly a

Doric colony and it ceases to exist as early as the 3rd century BC. There are very many cases in which the coins of *Heracleia* were subsequently overstruck by a mint we shall deal with next.

A city, or a ruler, or a magistrate, perhaps even a tribe issued coins with a legend which, in the abbreviated form, can be read as ΔΙ or ΔΙΜ. G. Novak (102) calls it the town of *Dimos*. Others have tried to attribute them to a certain town mentioned by *Polybios* and *Livius* – Δυμόλη, identified a few years ago as Krotinë in Albania (B. Dautaj. Zbulimi i quetit ilir Dimal. Résumé: La découverte de la cité illyrienne de Dimal (Dimallum). *Stud. Hist.*, 19, 2/1965: 93–105; *idem: Stud. Alban.*, 2/1965, 1; 65–71). The ΔΙ(Μ) coins have not been finally dealt with so far, but it is very probable that they might have been struck on the island of Hvar, in the actual town of Hvar, where large quantities of such coins have been unearthed. As it has been mentioned before, overstrikes are frequent in the Graeco-Illyrian coinage, double, sometimes even triple. The typology of the ΔΙ(Μ) coins is poor – Zeus' head on the obverse and the she-goat on the reverse, accompanied by the short legend (Pl. 1: 15, 16). After a long discussion, caused by the extreme difficulty in finding out the exact order in which the flans were re-used, it seems that the numismatists have finally agreed that the ΔΙ(Μ) mint used flans belonging to *Heracleia*, *Pharos* and *Issa* (the *Ionios* emissions). The system was to strike the obverse over the previous reverse and *vice versa*. The relative chronology proves thus that the ΔΙ(Μ) coins are later than the older Pharian types, as well as the Heracleian and the Issaeon ones.

There was another early colony in the Adriatic which was founded by the Knidians (130). This was *Korkyra*, 'Κυδίων κτίσμα' on the island of Korčula. One must be warned not to mistake this *Korkyra* for the city founded later by the Issaeans and well documented by the known *psephisma* from Lumbarda (12: 2–14). Therefore there were probably two ancient towns on the same island, one earlier *Knidian* and one later Issaeon and we also have two different sites: Vela Luka (i.e. the large harbour) and Lumbarda. Usually one hears of *Κόρκυρα ἢ μέλαινα*, but this term refers to the island itself, which was covered by dense forests in antiquity, and not to the city. Of all the types originally attributed to this *Korkyra* Brunšmid retains only one (12: 69; Pl. 2: 17), whereas the rest belongs to Korfu. The numismatic evidence has not been altered since. This unique type of coin has the head of a deity (*Apollo*?) on the obverse and an ear of corn on the reverse with the legend ΚΟΡΚΥΠΑΙΩΝ.

Further on we have the relatively rich emissions of the Parian colony of *Pharos* (12: 40–51), founded in 385/4 BC, the modern Stari Grad on the island of Hvar. The amount of preserved Pharian coins is quite large, although certain types are rare. Both silver and bronze were used, bronze being struck in four main denominations: one unit and its parts: one half, one quarter and one sixth. Of course, fluctuations are a normal thing. The main types are the following: *Zeus* – she-goat (Pl. 2: 18, 20); *Persephone* – she-goat (Pl. 7: 19); *Artemis* – she-goat (Pl. 2: 22); *Dionysos* – grape (Pl. 7: 21); *Dionysos* – *kantharos* (Pl. 2: 23). During the reign of the king *Ballaos* coins are issued as well from the same mint, of the so-called Pharian type (Pl. 2: 35) and it seems that

after his disappearance, the emissions of autonomous coinage continued with the *Dionysos* – *kantharos* type and ceased towards the last quarter of the 2nd century BC. The legend is ΦΑ, but the entire genitive appears too (ΦΑΡΙΩΝ).

We shall take somewhat longer studying the coins of *Issa*, whose reverse types, just like those of *Pharos* reflect the economy of the island. The she-goat is very frequent, just as it was on the DI(M) and the Pharian coins; the grape with vine-leaves and *kantharoi* appear as well. The inscription is ΙΣ (or IC), sometimes ΙΣΣΑ and there are many Pharian specimens with Issaeian overstrikes. The first Issaeian issues begin to appear towards the end of the 4th century BC – although the colony itself had been founded by the Syracusans at the beginning of the same century during the reign of Dionysos the Elder on a relatively small island far from the mainland. The site has been preserved underneath the modern town of Vis.

Sixteen or 17 types of Issaeian coin are known (12: 58–68) and their sequence is somewhat complicated. The emissions begin with the so-called *Ionio* coins. Here we encounter the very first individual person, a ruler, perhaps a magistrate, or, as some think, a hero. *Ionio* is the old Doric genitive of *Ionios*, and on one inscription found at Vis this island is described as 'Ιονίου νῆσος' which led Imhoof-Blumer and Brunšmid to the conclusion that *Ionios* was the mythic *eponymos* of the Ionian Gulf. D. Rendić-Miočević (135: 302–4; 138) has a different opinion, according to which *Ionios* was a real person. Specimens of this kind are either preserved in their original form, or bear traces of a posterior overstriking, as has been pointed out. Three types of *Ionio* coins are known:

1. male head, IONIO – dolphin r.;
2. male head, IONIO – dolphin over waves r.;
3. mature male head, IONIO – lion's head facing or r.

They can be dated to the mid-4th century BC (12: 59).

The complete series of *Issa* is the following one:

1. male head, IONIO – dolphin r., with or without waves;
2. *Hera* r. – dolphin r.; (Pl. 2: 24)
3. male head, IONIO – lion's head facing or r.;
4. Nymph, ΙΣΣΑ – star; (Pl. 2: 25)
5. *Athena Parthenos* r. – she-goat r., ΙΣ or IC; (Pl. 2: 26)
6. *Athena* r. – doe r., ΙΣ;
7. *Athena* r. – doe r., no legend;
8. *Athena* l. – stag r., ΙΣ;
9. *Herakles* r. – stag r., legend; (Pl. 2: 27)
10. male head r. – stag l., legend; (Pl. 2: 28)
11. *amphora*, ΙΣ – grape and vine-leaves; (Pl. 2: 29)
12. two heads: *Dionysos* and *Athena* r. – grape and vine-leaves, ΙΣ;
13. *Herakles* r. – *kantharos*, ΙΣ;
14. male head r. – *kantharos*, ΙΣ; (Pl. 7: 30)

15. female head r. — *kantharos*, ΙΣ; (Pl. 7: 31)
 16. female head r., ΙΣ — *kantharos*.

Besides the frequent overstrikes, countermarks have too been observed.

Before we turn our attention to Illyrian rulers, in order to complete the list of cities which minted coins, we must mention that *Rhizon*, the modern Risan deep in the Gulf of Kotor, south of Dubrovnik, also issued silver and bronze coins. Two most rare Rhizonitan coins were found and published by Sir Arthur Evans (38: 292, Pl. xiii: 9, 10). On the obverse one of them had the head of *Zeus* and the legend ΠΙ/ΖΟ within an olive wreath on the obverse, whereas the second specimen showed a beardless male head on the obverse and *Artemis* or *Hekate* with the legend ΠΙΖΟΝΙ/ΤΑΝ on the reverse. Both coins were very small and of bronze. Pink (121) attributes a completely different type of coin to the same mint, this time struck in silver and of good quality. These drachms have a Macedonian shield on the obverse and *Pegasos* accompanied by some letters on the reverse. The smaller denomination shows the same Macedonian shield, the reverse (star) being different. Nearly all of these coins described by Pink are now in Vienna and seem to have formed part of a relatively large hoard discovered in c. 1880 at Risan. Oxford has a few specimens of this type and several silver coins of both denominations have appeared recently on the market. *Rhizon* was the capital of the Illyrian kingdom twice during its history and was not a Greek city in the proper sense.

Also, far from the the coast, in modern Macedonia, at ancient *Lychnidos* (Ohrid) on the lake of Ohrid, coins were struck under strong Macedonian influence, showing a shield or a helmet, sometimes a galley (129; 157). Besides this, two Illyrian tribes have left us rare coins dating after 168 BC — the *Daorsoi* (3; 4; 6; 13: 74–5) who lived probably not far from the Neretva near Stolac in Hercegovina, with their stronghold at the Ošanići hill-fort; and the *Labiatai* (59; 60; 139a) on the *Lacus Labeatis* (the lake of Skadar, Shkodër). The latter have coins with a male head with the *kausia* on the obverse and a galley like the coins of *Skodra*, on the reverse, the former *Hermes* with the *petasos* and a galley too. The legends are ΔΑΟΡΣΩΝ and ΛΑΒΙΑΤΑΝ.

Coming now at last to the Illyrian rulers who struck coins (135; 139), we must begin with the earliest king we know of, with *Monounios* (32: 23–7; 139: 254–6; Pl. 1: 2), whose name can be found on some of the issues of *Dyrrhachion*. He bears the title of βασιλεὺς (βασιλέως Μονουνίου) and it is probable that he reigned either during the reign of *Alexander III*, or later, during the *Diadochoi*, possibly around 300–280 BC. The written sources mention two *Monounioi*, one Dardanian and one Illyrian, but it seems that they both were one and same person. His coins are preserved in Oxford, London, Cambridge, Zagreb (Pl. 1: 2), etc., mainly staters, or tridrachms, as Brunšmid and Ceka labelled them. A remarkable fact is that this king's helmet is kept in West Berlin and has recently been republished by F. Papazoglu (in *Živa ant.*, 21/1971, 1: 177–84). His son and successor seems to have been *Mytilos* (32: 66–72; 139: 257–8). There are very rare bronze coins with the legend βασιλέως Μυτίλ(ι)ου in Oxford, Turin, Tirana and Zagreb (Pl. 1: 4). On the obverse there is the head of *Herakles* with lion's skin and his attributes

with the above mentioned legend on the reverse. Their date may be *c.* 270 BC and it is probable that they were struck in *Dyrrhachium*.

Nearly 90 years later we encounter the last Illyrian king, at least the last one mentioned by ancient authors — *Genthios*. He ruled from *c.* 180 BC to 168 BC, when he was defeated by the Romans and taken prisoner together with his fabulous treasure containing 120,000 pounds of silver. He is known to have minted coins in two, possibly three mints: Lissos, Skodra, and *Dyrrhachion* (38; 39; 53–6). The only existing silver coin, in the Evans Collection, was struck in *Dyrrhachion* and it does not bear the name linked with the title of *basileus*, therefore in this case *Genthios* was a magistrate's name. Bronze, on the other hand, occurs more often (30 to 40 specimens known) and the inscription they usually bear is βασιλέως Γενθίου (135; 137; 139; Pl. 1: 10, worn). Although both *Lissos* and *Skodra* are in Albania, we might as well try to give the chronology of their coinage according to Brunšmid, Islami and Rendić-Miočević. Coins of *Lissos* can be divided into three main periods and six types:

1. Autonomy under Macedonian influence, *c.* 211–197 BC:
 - (a) she-goat — thunderbolts, ΛΙΣΣΙΤΑΝ;
 - (b) shield — helmet, ΛΙΣΣΙΤΑΝ;
 - (c) *Artemis* — thunderbolt, ΛΙΣΣΙΤΑΝ;
2. *Genthios*' rule:
 - (d) *Artemis* — thunderbolts, ΒΑCΙ ΓΕΝ;
 - (e) *Genthios* — galley, ΛΙΣΣΙΤΑΝ;
3. Roman domination after the fall of *Genthios*:
 - (f) *Hermes* — galley, with or without ΛΙΣΣΙΤΑΝ; (Pl. 1: 11)

Skodra on the other hand has also three main periods, but four types only:

1. Autonomy under Macedonian influence, 211–197 BC:
 - (a) Macedonian shield — helmet, ΣΚΟΔΡΙΝΩΝ;
2. *Genthios*' rule, *c.* 180–168 BC:
 - (b) Macedonian shield — galley, ΒΑΣΙΛΕΩΣ ΓΕΝΘΙΟΥ;
 - (c) *Genthios* — galley, ΒΑΣΙΛΕΩΣ ΓΕΝΘΙΟΥ;
3. Renewed autonomy under Roman influence, after 168 BC:
 - (d) *Zeus* of *Dodona* — galley, ΣΚΟΔΡ(Ε)ΙΝΩΝ and magistrates' names.

The last name to be given in this row is *Ballaaios*, a king not mentioned in ancient texts or on any inscription, a person historically completely unknown to us (38; 39; 43; 44, 132; 134; 135; 12: 76–86). While there are relatively few preserved coins of *Genthios*, the bronze coins of *Ballaaios*, who seems to have reigned after 168 BC, are very numerous. Silver occurs rarely (*c.* four specimens known). *Ballaaios* did not choose his seat in *Skodra* or *Lissos*, but in *Rhizon*, once queen *Teuta*'s capital. The legend on his coins appears in two different forms: ΒΑΛΛΑΙΟΥ and ΒΑΣΙΛΕΩΣ ΒΑΛΛΑΙΟΥ, as well as their cor-

rupted versions. As the first can be seen on the bulk of his coins found on the island of Hvar, sporadically and in hoards, in large quantities, one presumes, as Evans and Brunšmid did, that there were two series of his issues: the Pharian and the Rhizonitan. Both have the same type with the king's head on the obverse, stylistically differing a great deal from each other. On the reverse there is a figure of *Artemis* or *Hekate*, either marching, or standing (Pl. 2: 32–5) and holding a torch. The Rhizonitan mint produces *Artemis* of a better quality and walking (Pl. 7: 32–4), while the head of *Ballaos* is smaller and with more or less unrealistic features. *Pharos* on the other hand produces on the coins a standing *Artemis* and the king's face is nearer to a portrait (Pl. 2: 35). There are also many barbarous imitations with legends mainly illegible and there are suspicions that some of his contemporaries as well as his successors struck coins imitating his issues.

If we now leave the coast and its various issues and move into the interior of the country, what we see is a completely different picture, as we shall try to explain.

The Barbaro-Celtic coinage

We shall examine the Barbaro-Celtic coinage in the interior of Yugoslavia by following a line from north-west to the east and then southwards. Here in pre-Roman times there predominate the various gold (mainly the Boian staters and their parts, Pl. 3: 49, and imitations of staters of Alexander III: Pl. 3: 56–8), silver and bronze coinages (Pl. 3; Pl. 9), usually called the Norican and East Celtic, although the Barbarous is more appropriate as the coinage is Celtic only in most of the cases. These coins have been the subject of many works from the times of Forrer (40), Brunšmid (10), Paulsen (113), Dessewffy (34a), Pink (119; 121; 123) of Göbl (45a), Castelin (14–16), D. Allen and Mackensen (82a; 83). Here more than anywhere else coin hoards play a very important rôle as well as the stylistic analysis and the analysis of metal and weight standards. In many cases the sites have given names to major types.

Some aspects of Celtic numismatics are constantly changing and much has been added to it lately, especially by trying to consolidate the links between the archaeology of the Late Iron Age and numismatics, which had been only very loosely related. The

Plate III Barbaro-Celtic coinage in Yugoslavia, the Noricans:

36. Noricum, Varaždin/A, AR, tetradrachm, 24.0 × 25.0 mm., 12.32 gr., Nr.898; from Sisak; F. Dierich Coll, bought in 1864. 37. Noricum, Varaždin/B, AR, tetradrachm, 22.0 × 23.0 mm., 12.02 gr., Nr.899; possibly the Varaždin hoard 1843; 38. Noricum, Varaždin/B, AR, tetradrachm, 23.0 × 23.5 mm., 11.55 gr., Nr.902; possibly the Varaždin hoard 1843; 39. Noricum, Samobor/A, AR, tetradrachm, 24.0 × 25.0 mm., 11.30 gr., Samobor hoard 1922; 40. Noricum, Samobor/B, AR, tetradrachm, 24.0 × 25.0 mm., 10.63 gr., Samobor hoard 1922; 41. Noricum, Samobor/B, AR, tetradrachm, 24.0 × 25.0 mm., 10.75 gr., Samobor hoard 1922; 42. Noricum, Samobor/B, AR, tetradrachm, 25.0 × 26.0 mm., Samobor hoard 1922; 43. Noricum, Samobor/B, AR, tetradrachm with letters, 23.0 × 24.0 mm., 11.12 gr., Samobor hoard 1922; 44. Noricum, Đurđevac, AR, tetradrachm, 23.0 × 25.0 mm., 10.02 gr., Nr.955; Đurđevac hoard 1887; 45. Noricum, Đurđevac, AR, tetradrachm, 23.0 × 24.0 mm., 9.45 gr., Nr.942; Đurđevac hoard 1887; 46. Noricum, Frontalgesicht (Gesichtstyp), AR/AE, 23.0 × 26.0 mm., 7.54 gr., Nr.918; from Tounj; Jurković from Ogulin, exchange 1899; 47. Noricum, Verschwommener Typ, AR, tetradrachm, 24.0 × 25.0 mm., 10.06 gr., from Vrhnika (Oberlaibach) 1910; B. Horvat Coll. Nr.8888; 48. Noricum, Augentyp-Stamm, AR/AE, 23.5 × 25.0 mm., 9.10 gr.



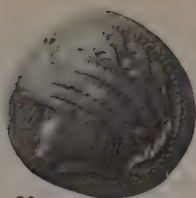
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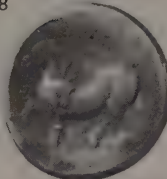
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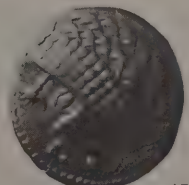
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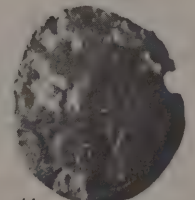
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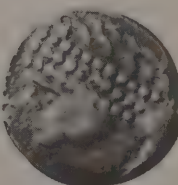
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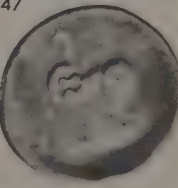
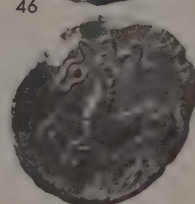
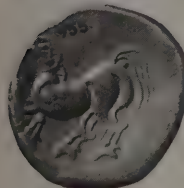
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dates proposed by Pink are still firm; there is a tendency, however, followed by Göbl, to lower them.

In Slovenia, covering a part of what was once the kingdom of Noricum, one finds coins belonging to Pink's south-eastern group of Norican coinage (East Noricans), which links the east and the west of the Celtic groups. It is divided into the earlier Styrian-Carnian (the so-called *Brezelohrtypus*, DIIM, OTE and *Augentypus*, Pl. 3: 48) dated around 80 BC, and the later Styrian group (TI-type), *Wuschelkopftypus*), dated after 80 BC, although these dates ought to be 20 years later. These groups do not reflect the real situation of the Late Iron Age in Slovenia.

The Celtic coinage began to attract attention quite early in Slovenia, already in the first half of the 19th century (5; 37; 125; 152; 153) and later on the literature dealing with it became quite opulent (14; 15; 16; 34; 77; 83; 104; 122; 142; 144). The latest survey of the Norican silver coinage has been given by M. Mackensen (82a). Besides the very many individual finds, in Slovenia we depend very much on various important coin hoards (Fig. 2). Here, a certain amount of confusion exists, caused by the old literature where German names were used, different from the Slovene ones, and by the fact that many hoards were found more than a century ago and were incompletely published. Therefore the die-comparison (*Stempelvergleichende Methode*) is a very welcome technique and we depend a great deal upon it. Generally speaking, in Yugoslavia one is not in the fortunate position, as is the case in Moravia, Slovakia, Germany, etc., of being able to speak in terms of mints of barbarous coinage. Until today no moulds for casting the silver blanks have been recorded.

Of the main coin hoards from the territory of Slovenia we ought to mention the following ones:

- Celje, Spodnji Lanovž (Unterlahndorf), s.a.: CONGESTLVS, tetradrachms, small silver of the Karlsteiner type; (Fig. 2: 5).
- Celje, c. 1966: small Norican silver: Type Magdalensberg (Gurina) and Type Karlstein; (Fig. 2: 7)
- Celje, railway station: 11 tetradrachms; (Fig. 2: 6)
- Dobrna-Retje, 1868: Brezelohr, Augentyp, Verwischter and Verprägter and TI type; OTE, Kladovo, Varaždin and Andisettes; (Fig. 2: 3)
- Lemberg, 1829: Boian mussel-staters, Brezelohrtypus, Augentypus, Verschommenentypus; (Fig. 2: 4)
- Melje (Melling) near Maribor, before 1865: Brezelohrtypus; (Fig. 2: 2)
- Vrhnika (Oberlaibach), 1885: types Đurđevac, Stradonitz, Karlstein, Gavina, Eis, ADNAMATI, NEMET and Legio xxii.

All the types found in the abovementioned hoards can be dated in the middle and late La Tène periods and their basic type is the so-called head of Apollo on the obverse given in very different interpretations, with a laurel-wreath combined with an astragal. On the reverse a horse is depicted. It is probable that these main types, except for some imported ones, such as the Boian silver (Pl. 3: 2) and gold (Pl. 3: 1), for instance, all seem

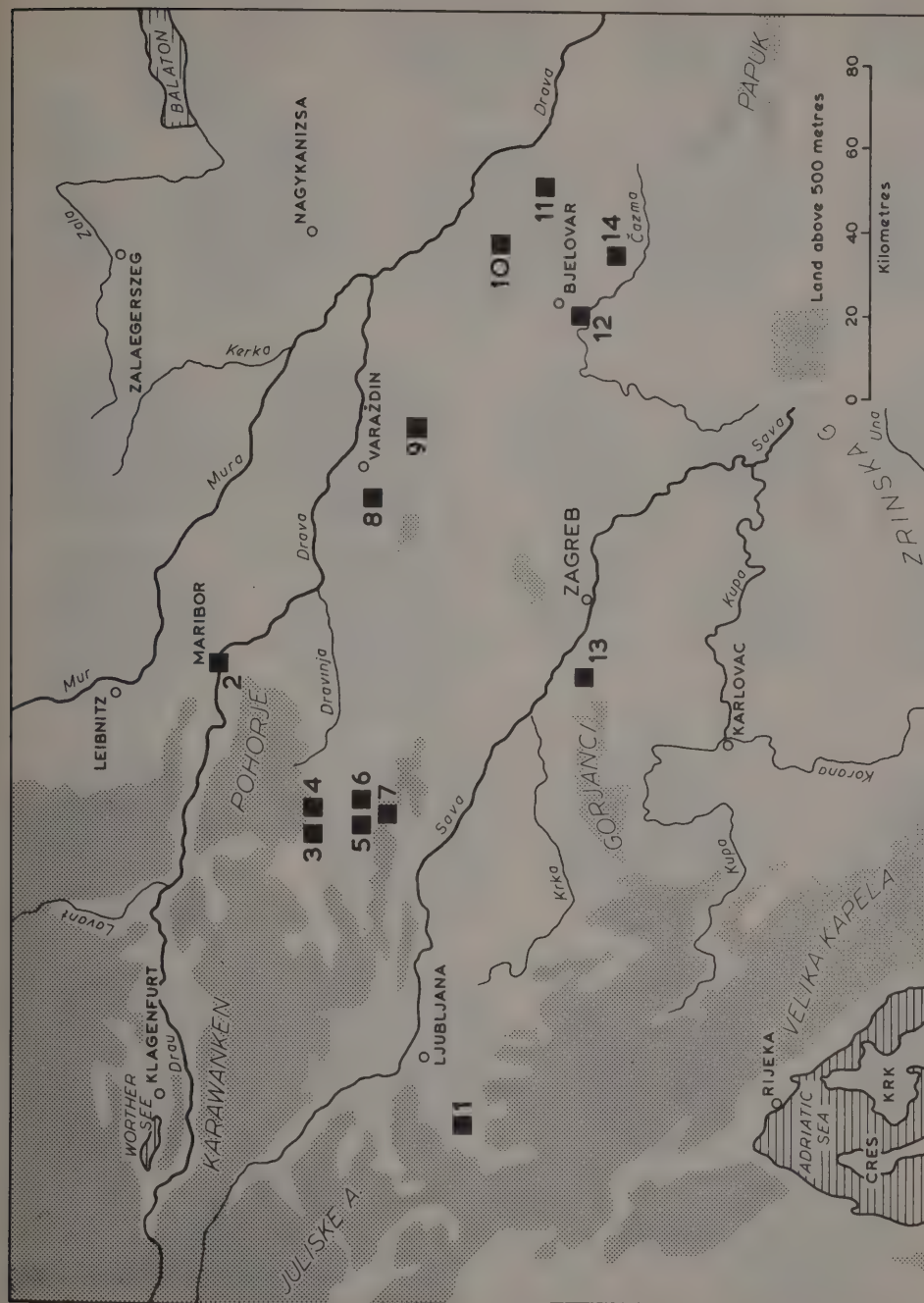


Fig. 2. Hoards of Celtic coins in Slovenia and North-West Croatia: 1. Vrhnika (Oberlaibach) 1885; 2. Melje (Melling) near Maribor, before 1865; 3. Dobrna Retje (Doberna Retje bei Trifail) 1868; 4. Lemberg near Dobrna 1829; 5. Celje (Cilli), Spodnji Lanovž (Unterlahndorf); 6. Celje (Cilli), before 1966; 7. Celje (Cilli), railway station, before 1887; 8. Varaždin (Varasdin), in fact Križovljan, 1843; 9. Bajšina near Varaždinske Toplice, c. 1850; 10. Đurđevac (St. Georgen, Szt. György, Gjurgievac) 1887; 11. Kozarevac, c. 1906; 12. Narta 1894; 13. Samobor, in fact Okučani, 1922; 14. Ribnjakča 1941.

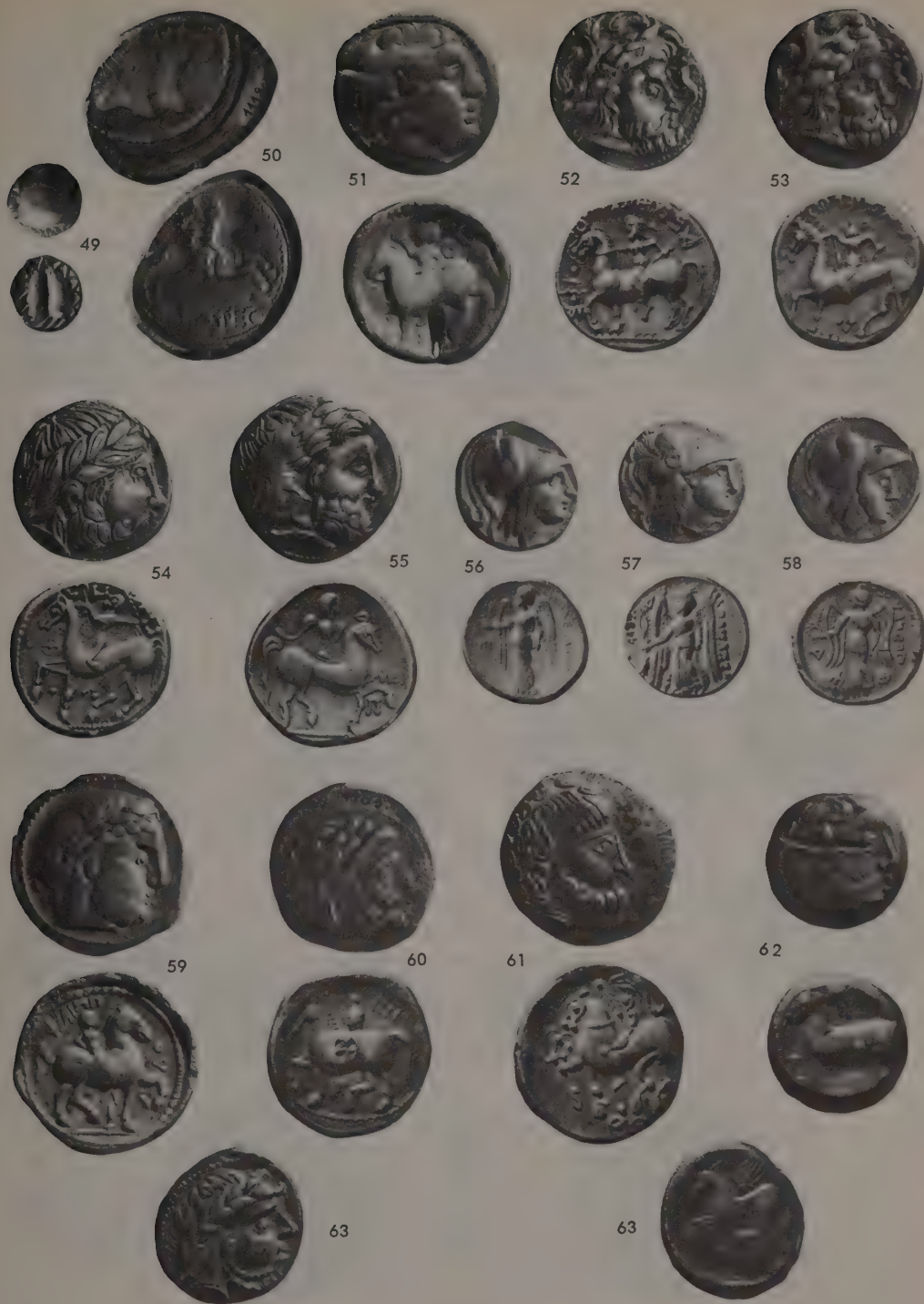
to be autochthonous. In this Celtic world Celje (Cilli, the Roman Celeia) must have played a very important rôle as a strong centre, with many hoards and numerous individual finds of Celtic coins.

Moving now eastwards, to Croatia, we meet the barbarous coins of the so-called Croatian group, which is older and which is divided into three major types, named after the most important hoards of the coins of the type concerned: the Varaždin type (in fact Križovljan near Varaždin; Pl. 8: 36–8); the Samobor type (in fact Okić near Samobor; Pl. 8: 39–43) and the Đurđevac type (Pl. 3: 44, 45), all dated to the 1st century BC. Neither of these hoards has been properly and completely published, so that some unsuspected new data can be expected. The Varaždin type, named after the large hoard from Križovljan near Varaždin (Fig. 2: 8) found in 1843 and containing 109 tetradrachms of good silver, has an average weight of 12.3 gr. (for the Type A, Pl. 3: 36, between 12.70 and 13.59 gr. and for the Type B, Pl. 3: 37–8, between 11.40 and 12.40 gr.). The Varaždin type is usually set around the year 90 BC. The second type, named after the hoard found in 1922 (c. 1,300 pieces) and preserved in its larger part in the Archaeological Museum in Zagreb (49; Fig. 2: 13), has an average weight of c. 11 gr., although the discrepancies within the hoards itself are great, ranging from 5.61 to 11.77 gr. The quality of silver is not as good as of the former type. The Samobor A type reminds us still of the Varaždin type, while the rest of the series of Samobor A (pl. 3: 40) and Samobor B (Pl. 3: 41–3), which seems to be contemporary, show a different stylisation of both the head of Apollo and the horse. On few Samobor coins some letters appear as well (Pl. 3: 43).

The last type of this group includes tetradrachms of even baser silver and lower weight — average c. 16 gr., ranging from 9.0 to 10.50 gr. It reminds us of the Samobor type, only the face has undergone a few changes, especially the interpretation of the nose, and the horse, which acquires crescent or knife-like hooves. This Đurđevac (Gjurgjevac, St. Georgen, Szt. György) type is named after the hoard of c. 400 tetradrachms found at Đurđevac in 1887 (Fig. 2: 10; Pl. 8: 44, 45).

Plate IV Barbaro-Celtic coinage in Yugoslavia:

49. Boii, AV, 1/3 stater, 10.0 × 11.0 mm., 2.38 gr., Nr.7445; W. Trinks, Vienna, purchased in 1913; 50. Boii, Biatic type, AR, 23.0 × 29.0 mm., 17.12 gr., Nr.1118; 51. Type of Philip II, AR, tetradrachm, 23.5 × 24.5 mm., 13.17 gr., Nr.1154; Narta hoard 1894; 52. Turnierreiter I, AR, tetradrachm, 23.0 × 24.0 mm., 12.70 gr., Ribnjačka hoard 1941; 53. Turnierreiter II, AR, tetradrachm, 22.5 × 23.5 mm., 12.72 gr., Ribnjačka hoard 1941; 54. Kinnloser Type, AR, tetradrachm, 23.5 mm., 12.5 gr., Ribnjačka hoard 1941; 55. Audoleon Type, AR, tetradrachm, 24.0 mm., 12.83 gr., Ribnjačka hoard 1941; 56. Pannonia, type of Alexander III, AV, stater, 18.0 × 19.0 mm., 8.33 gr., Nr.1188; from Radoboj; Coll. Lj. Gaj; 57. Pannonia, type of Alexander III, AV, stater, 19.0 mm., 8.32 gr., Nr.1187; ancient Museum coll.; 58. Pannonia, type of Alexander III, AV, stater, 19.0 × 20.0 mm., 8.54 gr., from near Ludbreg; purchased from J. Kon 1906; Nr.4674; 59. Type of Philip II, AR, tetradrachm, 26.0 × 27.0 mm., 13.32 gr., Nr.6085; from Serbia, bought from R. Rašković, Belgrade 1909; 60. Banat, AR, 24.0 × 25.0 mm., 12.34 gr., Nr.1163; from Ostružnica quarry between Belgrade and Šabac; Ing. A. Bukvić, Mitrovica, pres. 1900; 61. Bačka, AR, 25.0 × 26.0 mm., 13.73 gr., Nr.5414; from Martinci; Đ. Griesback, Mitrovica, purchased in 1906; 62. Srijem, Eselsorhtypus, AR, didrachm, 20.0 × 21.0 mm., 13.12 gr., Nr.8183; Coll. N. Plavšić, Osijek, purchased in 1915; 63. Srijem, AR, 21.0 × 23.0 mm., 11.40 gr., B. Horvat Coll.



Some of the East Noricans, mentioned as from Slovenia, must be of the Samobor origin, or its strong influence — for instance the *Frontalgesicht* (Pl. 3: 46), or the *Augentyp-Stamm* (Pl. 3: 48), as well as the *Freie Samobor-Typen*. Others are of a more independent origin: the *Brezelohr*, *Wuschelkopf*, *Unscharfer-Typ Gruppe*, or the *Verschwommener Typus* (Pl. 3: 47).

It would be a great error not to speak about the other main coin hoards from Croatia, especially the ones from Narta (Fig. 2: 12) and Ribnjačka (Fig. 2: 14). The first was discovered in 1894 and published in the following year by J. Brunšmid (10). Among other coins it contained types of Dacian provenance imitating the tetradrachms of *Philip II* of Macedonia. The coins are very worn and with cuts (Pl. 4: 51) and are dated to the 2nd century BC. The hoard found at Ribnjačka near Bjelovar (75; 76; 123) in 1941, amazing not by its quantity, but by its contents, also consisted of coins of various provenance, considered as the most beautiful and skilfully executed barbarous coins in these parts of Europe (Pl. 4: 52–5). These tetradrachms of fine silver, dated to the 2nd century BC, belong to three main types: to the so-called *Turnierreiter* with an upright or a lowered lance in the reverse and an unintelligible inscription (Pl. 4: 52, 53), belonging according to Pink to new types of the South-Serbian group of the East Celtic coinage; to the type with the chinless face (*Kinnloser Typ*) (Pl. 4: 54); and finally to the *Audoleon* type belonging to the North group of the East Celtic coinage and imitating the silver issues of the Paeonian king *Audoleon*. This hoard, only partly dispersed, still awaits final publication, although it has already been dealt with by Pink (123) and Lišić (75; 76).

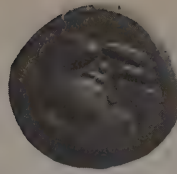
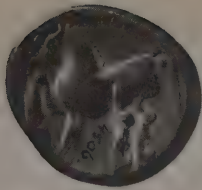
Gold was in circulation in Croatia as well, mainly imitations of the staters of *Alexander III* (Pl. 4: 56–8), yet they are known as sporadic finds and not from hoards.

The main features of the Southern group of the East Celts in Serbia and Vojvodina are the Syrmian (Pl. 4: 62; 63; Pl. 5: 64–6), the Bačka (Bácska; Pl. 4: 61) and the Banat (Pl. 4: 60) types in the northern parts, intermingled with some of the coins of the Eastern group of Dacian types from modern Rumania (Pl. 5: 67–70) and with earlier barbarous imitations of Greek coins of *Philip II* (Pl. 4: 59), *Alexander III* (Pl. 5: 71–5), *Philip III*, *Lysimachos* and *Thasos* (Pl. 5: 76) in the south, to mention the most common ones. Not many hoards from Serbia have been published (Fig. 3), therefore one depends mainly upon the typological analysis and upon the works by Count Dessewffy (43a) and

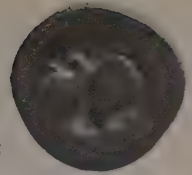
- Plate V 64. Srijem, Kugelwange, AR, 23.0 × 26.0 mm., 10.60 gr., Nr.4506; from Progar, purchased from Dr I. Abjanić 1904; 65. Pannonia, AE, 22.0 × 23.0 mm., 8.24 gr., Nr.7889, from Dalj, purchased from F. Bugar in 1914; 66. Pannonia, AR, 14.0 mm., 2.38 gr., Nr.1004, from Novi Banovci, purchased from F. Manot in 1902; 67. Dacia, type of Philip II, AR, 25.5 × 26.0 mm., 12.20 gr., Nr.1151, Coll. Dr N. Gržetić; 68. Dacia, scyphate, AR, 31.0 × 33.0 mm., 12.58 gr., Nr.1153, Coll. Dr N. Gržetić; 69. Dacia, tetradrachm, AR, 24.0 × 25.0 mm., 12.76 gr., Coll. N. Plavšić, Osijek, purchased 1915; 70. Pannonia, AR, 13.5 mm., 2.60 gr., Nr.1081, from Novi Banovci, purchased from F. Manot 1902; 71. Type of Alexander III, tetradrachm (?), AR, 25.0 × 27.0 mm., 17.22 gr., Nr.1181, from Serbia, purchased in 1896; 72. Dardania (?), type of Philip III, AR, 28.5 × 29.0 mm., 15.10 gr., Nr.8194, from Albania, bought from I. Petrović, Prizren; 73. Type of Alexander III or Philip III, AR, 28.0 × 30.0 mm., Nr.1182; 74. Type of Alexander III, AR, drachm, 17.0 × 18.0 mm., 4.22 gr., Nr.5816; 75. Type of Alexander III, AR, drachm, 2.75 gr., 16.0 × 17.0 mm., Nr.8194; 76. Type of Thasos, AR, 32.0 × 33.0 mm., 19.95 gr., Nr.1818; 77. Pannonia, small silver, AR, 6.0 × 8.0 mm., 0.13 gr., from Novi Banovci, purchased from F. Manot 1902.



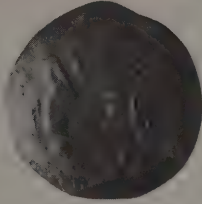
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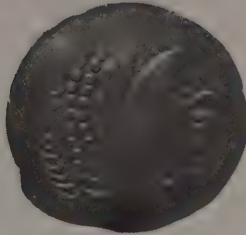
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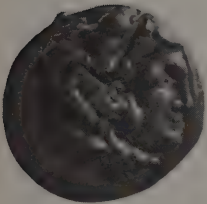
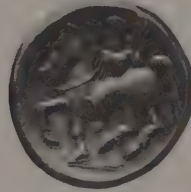
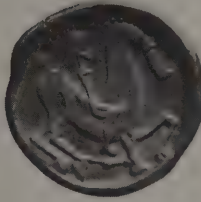
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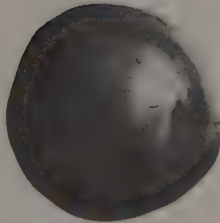
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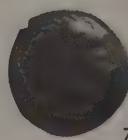
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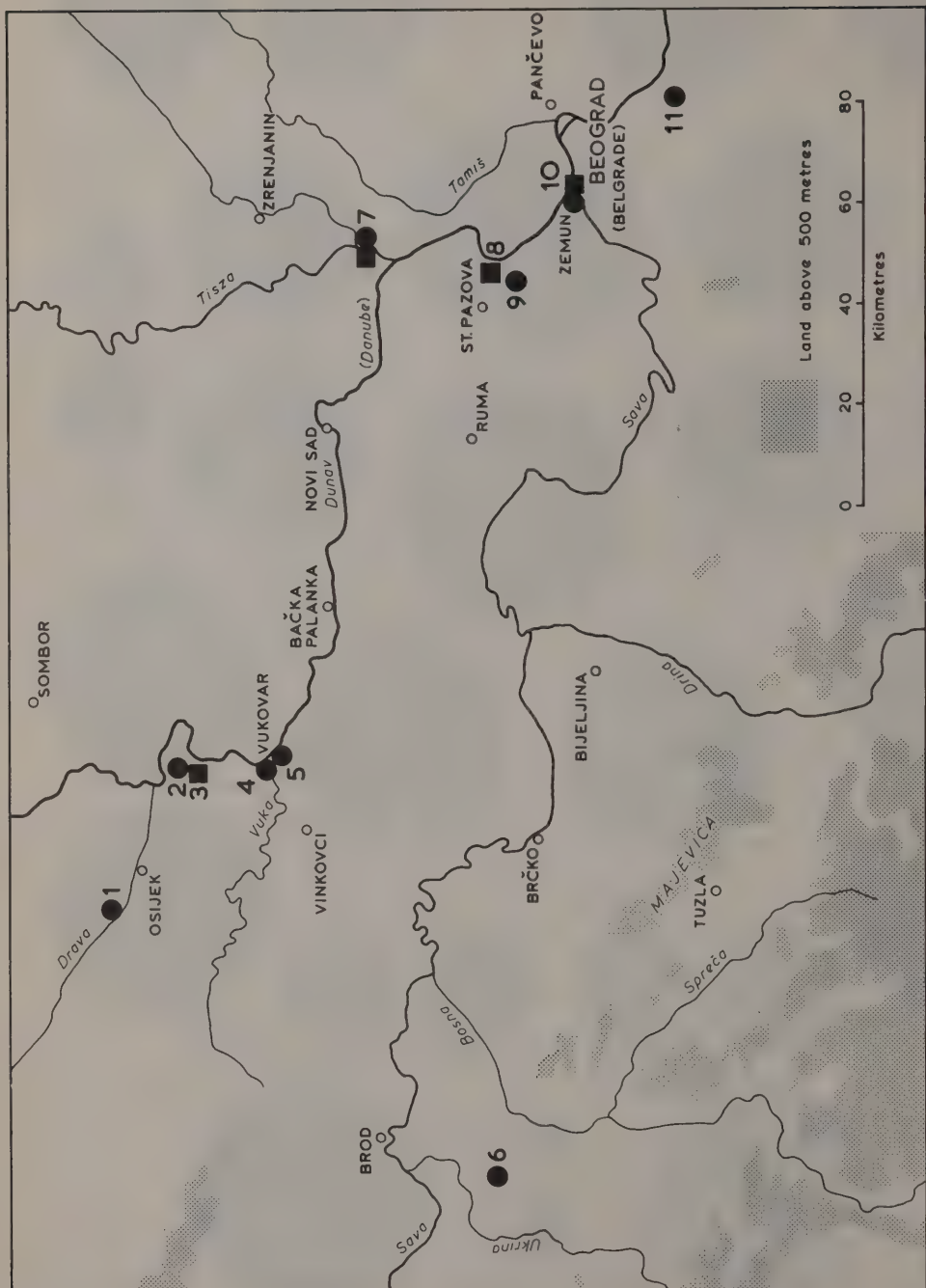


Fig. 3. Main hoards of pre-Roman currency in West Croatia (Slavonia) and North Serbia and Vojvodina: (Dots represent Greek, squares Celtic coins) 1. Valpovo-Osijek 1886, Roman republican coins; 2. Dalj, c. 1910, Apollonia and Dyrrhachion; 3. Sarvas; 4. Vukovar 1912, Apollonia and Dyrrhachion, Roman republican denarii; 5. Vukovar 1961, Apollonia and Dyrrhachion; 6. Dobra Voda nr. Derventa, 1880, Apollonia and Dyrrhachion; 7. Titel 1910, Apollonia and Dyrrhachion and Celtic coins; 8. Novi Banovci, perhaps a hoard; 9. Nova Pazova c. 1948, Apollonia and Dyrrhachion; 10. Zemun 1924, Greek and Celtic coins; 11. Zaklopača 1928, Apollonia and Dyrrhachion.

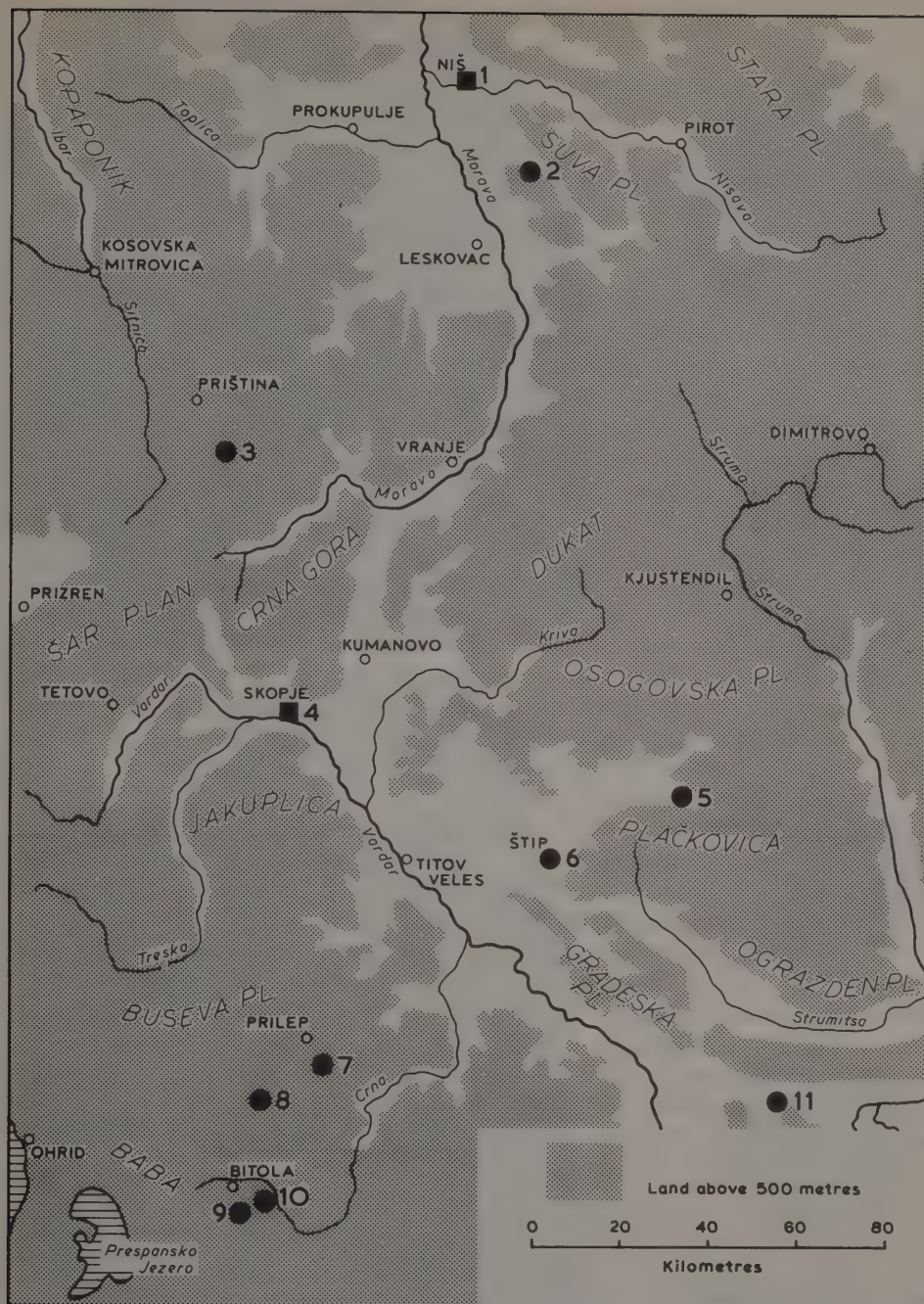


Fig. 4 Main hoards of pre-Roman currency in South Serbia, Kosovo and Metohija and Macedonia: (Dots indicate Greek and squares Celtic coins) 1. Niš, before 1939; 2. Kutina 1923; 3. Janjevo; 4. Skopje, before 1922; 5. Grad, after 1945; 6. Štip (Ishtib) c. 1912; 7. Prilepec 1950; 8. Topolčane 1917; 9. Dolno Egri, after 1945; 10. Grajšte, after 1945; 11. Dojran 1932.

K. Pink (120), although much interesting work is in progress, done by our Serbian and Rumanian colleagues. More to the south, in Macedonia, very many hoards have been discovered, in which the Celtic coins were hidden together with Greek ones, but the further we go, Greek coins become the only currency, both in hoards (Fig. 4) and as individual finds, coming from all the corners of the Greek world and from Archaic, Classical and Hellenistic times (51; 63; 64; 72; 73; 97; 117; 156; 158). Thus the circle is closed.

Returning to the East Celtic coinage of the Syrmian group, one can observe very frequent occurrence of thick flans (*Dickschröttlinge*), for example of the so-called Donkey's Ear type (*Eselsohrtypus*, Pl. 4: 62). The Syrmian group is usually dated to the last decade of the 2nd century BC. The didrachm shown on Pl. 4: 62 has a very superficially executed head, which used to depict *Zeus*, on the obverse, and the horse on the reverse with its massive body and long bent ears reminds us of a donkey indeed. On other types, the so-called *Kugelwange* is to be pointed out on the obverse, and a *Pegasos* or a Griffin on the reverse (Pl. 4: 63). The later coins of this type show a very strong *Kugelwange* (Pl. 5: 64–6), both on silver (tetradrachms and small silver) and bronze coins, and the horse on the reverse receives a dotted mane and a circlet above. The Bačka group boasts baroque lines and curves and a certain amount of *horror vacui*, and on the reverse the horse carries a horseman (Pl. 4: 61) – it is usually thought that coins with the rider are earlier than the ones with the horse only. The Banat types, on the other hand, representing the very centre of the East Celtic coinage, produce a very skilfully executed bearded head with a laurel wreath on the obverse, which is not very far from the Greek original (Pl. 4: 60). The very plump horse and its rider without legs on the reverse are a creation of its own manner. Counter-marks are not rare.

Considerable quantities of East Celtic coins of the East Group from Rumania have been found in North Serbia (Pl. 5: 67–70), as it has been the case with Croatia. The denominations vary, from the usual tetradrachms, sometimes large scyphate coins, to didrachms and drachms, as well as small silver (Pl. 5: 77).

The question may now be asked about what was happening in the central Balkans which we have left out, analysing first the situation on the Illyrian coast, and the following a curved line extending from *Noricum* to *Macedonia*. It is striking that Illyrian coins of *Issa*, *Pharos*, *Herakleia*, etc. did not reach far into the interior as did the coins of *Apollonia* and *Dyrrhachion* (13; 35; 85; 106–10; 112; 124), especially drachms which have been found sporadically and in hoards in Bosnia and Hercegovina and as far as the Danube (Fig. 3: Dalj 1910, Dobra Voda 1880, Ljubuški before 1902, Nova Pazova c.

Plate VI 78. *Aes signatum*, quadrilater, AE, 940.0 × 750.0 mm., 761.30 gr., (thickness 22.0 mm.), Brunšmid, 1902, Nr.vii, Mazin hoard 1896; 79. Carthago, AE, 28.0 × 29.5 mm., 17.13 gr., Mazin hoard 1896; 80. Numidia, Masinissa (?), AE, 26.0 × 28.0 mm., 14.33 gr., Nr.4345. Mazin hoard 1896.

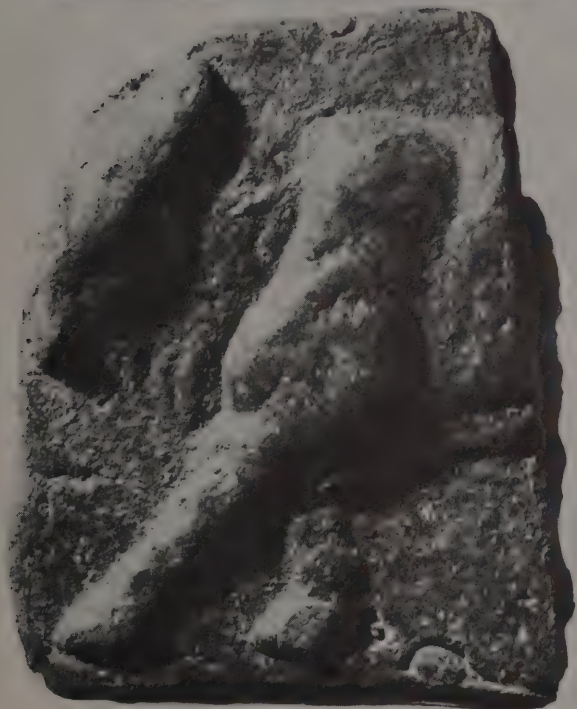
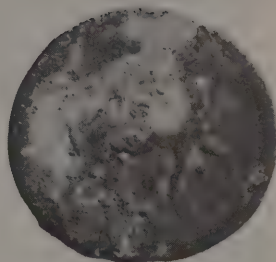
Plate VII 81. Rome, libral as, AE, 66.0 × 68.0 mm., 289.72 gr., Mazin hoard 1896; 82. Latium, aes grave, AE, 56.0 × 63.0 mm., 250.45 gr., Mazin hoard 1896; 83. Carthago, AE, 46.0 mm., 102.32 gr., Nr.4223, Mazin hoard 1896; 84. Carthago Zeugitanae, AV, 19.0 mm., 7.70 gr., Nr.8433, Coll. N. Plavšić, purchased 1915.



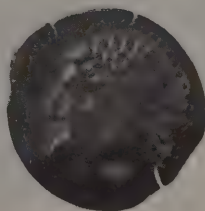
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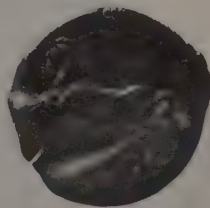
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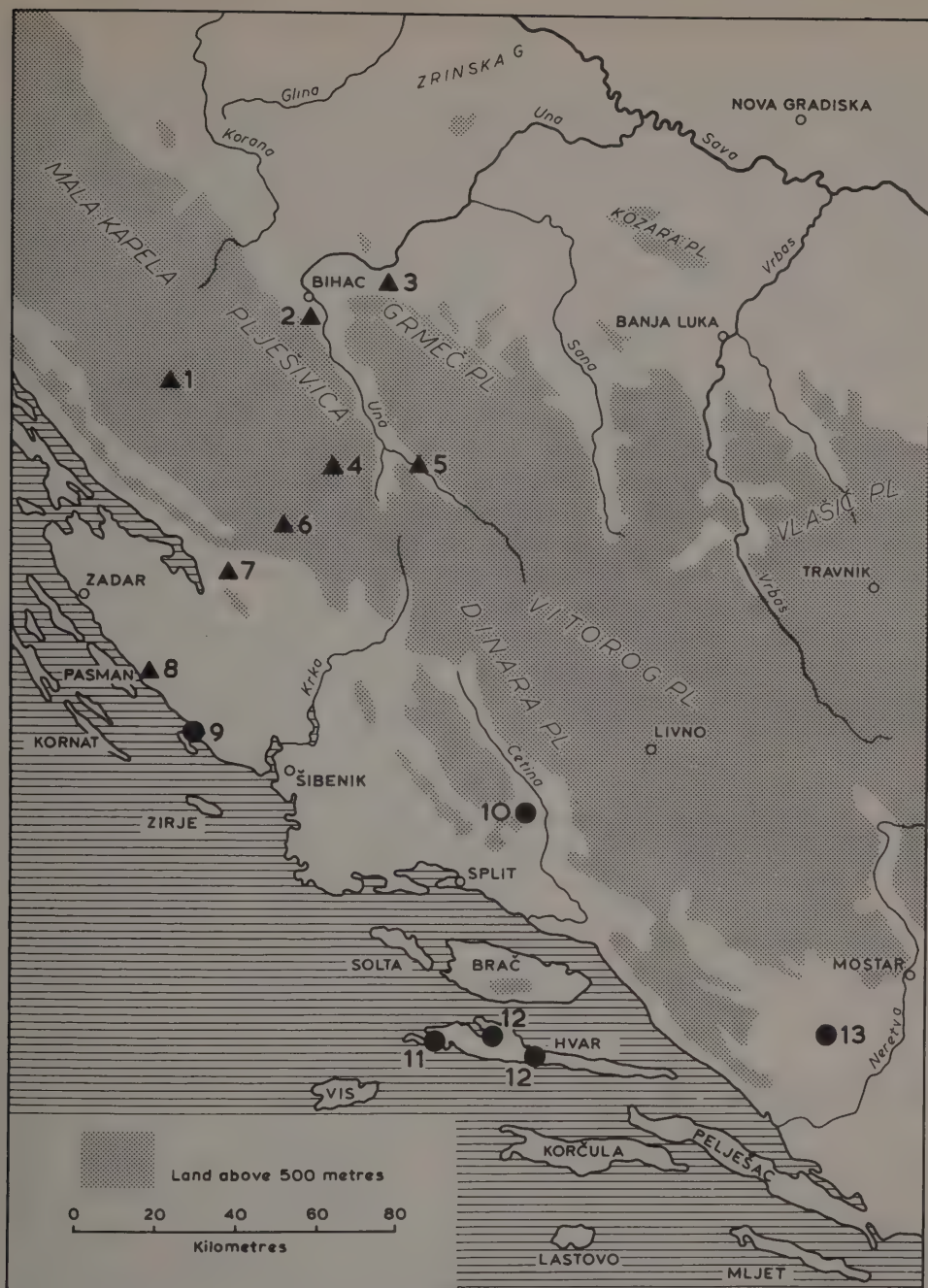


Fig. 5 Main hoards of pre-Roman currency in South Croatia (Lika, Krbava and Dalmatia), Bosnia and Hercegovina: (Dots indicate hoards of Graeco-Illyrian and heavy Italic currency) 1. Siroka Kula 1846; 2. Krivaja? (Kruinwa), c. 1932; 3. Vrankamen 1887; 4. Mazin 1896; 5. Donji Unac; 6. Gračac 1925; 7. Obrovac 1958–59; 8. Marpurgo? nr. Biograd (?) 1932; 9. Murter, before 1919, Herakleia; 10. Sinj, before 1939, Damastion; 11. Hvar (Lesina), before 1837, Pharos, Akragas, Herakleia, Issa; 12. Stari Grad (Città Vecchia) 1836, Herakleia, Issa (Ionios), Pharos; 13. Ljubuški, before 1902, Apollonia and Dyrrhachium.

1948, Titel before 1922, Vukovar 1912, Vukovar 1961, Zaklopača 1928, to quote only the most important hoards, of which one weighed 15 kg.). Damastian tetradrachms have also been uncovered in the interior of Yugoslavia (Figs. 4 and 5: Janjevo, Kutina 1923, Risan 1927, Sinj 1939, etc.). In Bosnia and Hercegovina there are also finds of imported Barbaro-Celtic coins, for instance the Noricans and imitations of *Philip II*, and the hypothesis of the existence of a coinage issued by the *Iapodes* is very improbable (67a).

The most interesting features of these regions are the density and frequent finds of Carthaginian, Numidian and Egyptian coinage (Pl. 6: 79, 80; Pl. 12: 83–4) of various denominations, mainly of bronze, found in large hoards in connection with Italic heavy currency (1: 2: 11: 46: 71: 154: 155: Pl. 6: 78; Pl. 7: 81, 82). All these hoards follow a line along the rivers Zrmanja, Lika and Una (Pl. 5) and the main ones are: Donji Unac, Gračac 1925, Obrovac 1958, Mazin 1896, Vrankamen 1887, Krivaja? (Kruinwa?) c. 1932, and finally Široka Kula 1846 and Zvonigrad. They all must have been buried towards the beginning of the 1st century BC, or in the late 2nd century BC. Of all these hoards the most representative must have been a hoard of several hundreds of Carthaginian gold coins from a place called Marpurgo, possibly near Biograd on the coast and not Belgrade, mentioned by a very short and most misleading note in *Rassegna numismatica* (1932, Trovamenti, p. 91). The coins may have been of the type shown on Pl. 7: 88. Since this hoard was dispersed as soon as it was discovered, the most interesting and also the largest extant is the hoard from Mazin, preserved in its entirety in the Zagreb collection. It was published by Brunšmid (11) and Bahrfeldt (1–2) and later on studied and quoted by many other scholars – Haeberlin (46), Mazard (92), Kurz (70, 71), Crawford (19), Jenkins and Lewis (57) and Pegan (114). It contained coins of *Carthago* in several denominations, coins of *Numidia* and Egypt and finally large quantities of broken bronze ornaments, *aes rude* and many fragments of *aes signatum* (Pl. 6: 78). The first Italic cast coins appear here with the head of *Janus* on the obverse and the *rostrum* on the reverse (Pl. 7: 81) and thus the Roman coinage makes its appearance in the Balkans for the first time around the turn of the 2nd to the 1st century BC, when this hoard was concealed. Later on the actual Roman conquest takes place and culminates in the wars of *Octavianus Augustus*, but by that time the Roman republican coinage had already preceded the invaders and penetrated deep into the hinterland.

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Abstract

In this paper the authors have tried to give a general picture of the first coins which were in circulation in the territory of the modern state of Yugoslavia until the arrival of the Romans. The coinage in question can be divided into two groups – the so-called Graeco-Illyrian coinage along the Adriatic coast and the Barbaro-Celtic coinage in the interior of the country. The former is older and was issued by Greek colonies, Illyrian cities, kings and tribes, from the 4th to the 2nd centuries BC, whereas the latter is younger, belonging to the 2nd and 1st centuries BC. There is a very big difference between the two groups both in metal, size and execution. The authors analyse the situation first by following the Illyrian coast and then by showing the main types and hoards in the interior of the country.

ABBREVIATIONS

- Arch. Austr.*
Arch. Jugosl.
Arch. stor. Dalm.
Archiv Gesch.
Argo (Nar. Muz. Ljubljana)
Arh. vest.
Ark. pověs. jugosl.
Berl. Münzbl.

Braničevo
Bul. ark.
Bull. arch. st. dalm.
Bull. Inst. corr. arch.
Bul. shkenc. shoq.
Bul. Univ. Shtet.

Časop. zgod. narodop.

Diss. Pann
Gaz. Zara
Gl. Zem. muz.

Gl. Izd. Muz. konz. dr. Maked.
Glas Srp. akad. nauka
Godiš. Cent. balkanol. ispit.

Hist. zb.
Iliria
Istria
Jadr. dn.
Jb. Num. Geld.

Jour. Rom. Stud.
Jugosl. pošta
Knjiž
Mitt. Hist. Ver. Krain
Mitt. Num. Ges.
- Archaeologia Austriaca*, Wien.
Archaeologia Jugoslavica, Beograd.
Archivio storico per la Dalmazia, Roma.
Archiv für Kunde österreichischen Geschichtsquellen, Wien.
Argo. Informativno glasilo za arheologijo, zgodovino umetnosti in muzeologijo, Ljubljana, Narodni muzej.
Arheološki vestnik. Acta archaeologica, Ljubljana.
Arkiv za povēstnicu jugoslavensku, Archive for Yugoslav History, Zagreb.
Berliner Münzblätter, Vereinigte Numismatische Gesellschaft Deutschlands und Oesterreichs, Berlin-Gotha.
Braničevo, Beograd.
Buletin arkeologjik, Tiranē.
Buletino di archeologia e storia dalmata, Spalato.
Bulletino dell' Instituto di corrispondenza archeologica, Roma.
Buletin për shkencat shoqërore, [Bulletin of Social Sciences.] Tiranē.
Buletin i Universitetit Shtetëror të Tiranës, Seria shkencat shoqërore, [Bulletin of the State University in Tirana. Series: Social Sciences.] Tiranē.
Časopis za zgodovino in narodopisje, [Journal of History and Ethnography.] Maribor.
Dissertationes Pannonicae, Budapest.
Gazzetta di Zara, Zara.
Glasnik Zemaljskog muzeja u Bosni i Hercegovini, [News of the Museum of Bosnia and Hercegovina.] Sarajevo.
Glasnik. Izdanija na Muzejsko-konzer društvo no N.R. Makedonija, Skopje.

Glas Srpske akademije nauka. Glas, Académie serbe des sciences, Beograd.
Naučno društvo Bosne i Hercegovine. Godišnjak. Centar za balkanološka ispitivanja, Société savante de Bosnie-Herzégovine, Annuaire, Centre d'études balkaniques, Sarajevo.
Historijski zbornik, [Historical Miscellanea.] Zagreb.
Iliria, Tiranē.
Istria, Trieste.
Jadranski dnevnik, Split.
Jahrbuch für Numismatik und Geldgeschichte, Bayerische numismatische Gesellschaft, München.
Journal of Roman Studies, London.
Jugoslavenska pošta, Beograd.
Književnik, [The Writer.] Zagreb.
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- Monatsbl. numis. Ges.* *Monatsblatt der numismatischen Gesellschaft in Wien.* Wien.
- Mus. Notes* *American Numismatic Society. Museum Notes.* New York.
- Muzeji* *Muzeji. Museums.* Beograd.
- Novice* *Novice gospodarske, obrtniške in narodne.* Ljubljana.
- Num. chron.* *Numismatic Chronicle.* London.
- Num. Notes* *American Numismatic Society. Numismatic Notes and Monographs.* New York.
- Numizmatičar* *Numizmatičar. (The Numismatist.)* Beograd.
- Numismatika* *Numismatika (Numizmatika).* Zagreb.
- Num. vij.* *Numizmatičke vijesti. [Numismatic News.]* Zagreb.
- Num. Ztschr.* *Numismatische Zeitschrift.* Wien.
- Otkrića* *Otkrića. Epoha.* Zagreb.
- Rad. Fil. fakul. Zadar* *Radovi. Filozofski fakultet Zadar. Razdio historije, arheologije i historije umjetnosti. [Works. Philosophical Faculty of Zadar. Department: History, Archaeology and History of Art.]* Zadar.
- Rad Jug. akad. znan. umjet.* *Rad Jugoslavenske akademije znanosti i umjetnosti. [Works of the Yugoslav Academy of Sciences and Arts.]* Zagreb.
- Rev. num.* *Revue numismatique.* Paris.
- Saopštenja* *Saopštenja Zavoda za zaštitu i naučno proučavanje spomenika kulture Narodne Republike Srbije.* Beograd.
- Starinar* *Starinar.* Beograd.
- Stud. Alban.* *Studia Albanica.* Tiranë.
- Stud. hist.* *Studime historike.* Tiranë.
- Tovariš.* *Tovariš.* Ljubljana.
- Vies. Hrv. ark. dr.* *Viestnik Hrvatskoga arheološkoga društva. [News of the Croation Archaeological Society.]* Zagreb.
- Vies. Nar. zem. muz.* *Viesnik Narodnoga zemalškoga muzeja u Zagrebu. [News of the National Museum in Zagreb.]* Zagreb.
- Vj. arh. hist. dalm.* *Vjesnik za arheologiju i historiju dalmatinsku. Bulletin d'archéologie et histoire dalmate.* Split.
- Vj. Arheol. muz. Zagreb* *Vjesnik Arheološkog muzeja u Zagrebu.* Zagreb.
- Vreme* *Vreme.* Beograd.
- Wien. präh. Ztschr.* *Wiener prähistorische Zeitschrift.* Wien.
- Wiss. Mitth. Bos. Herc.* *Wissenschaftliche Mittheilungen aus Bosnien und der Hercegovina.* Wien.
- Zbor. rad. Narod. muz.* *Zbornik radova Narodnog muzeja. Recueil des travaux du Musée national.* Beograd.
- Ztschr. Num.* *Zeitschrift für Numismatik.* Wien.
- Živa ant.* *Živa antika. Antiquité vivante.* Skopje.

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Late Bronze Age and earliest Iron Age in Kazakhstan*

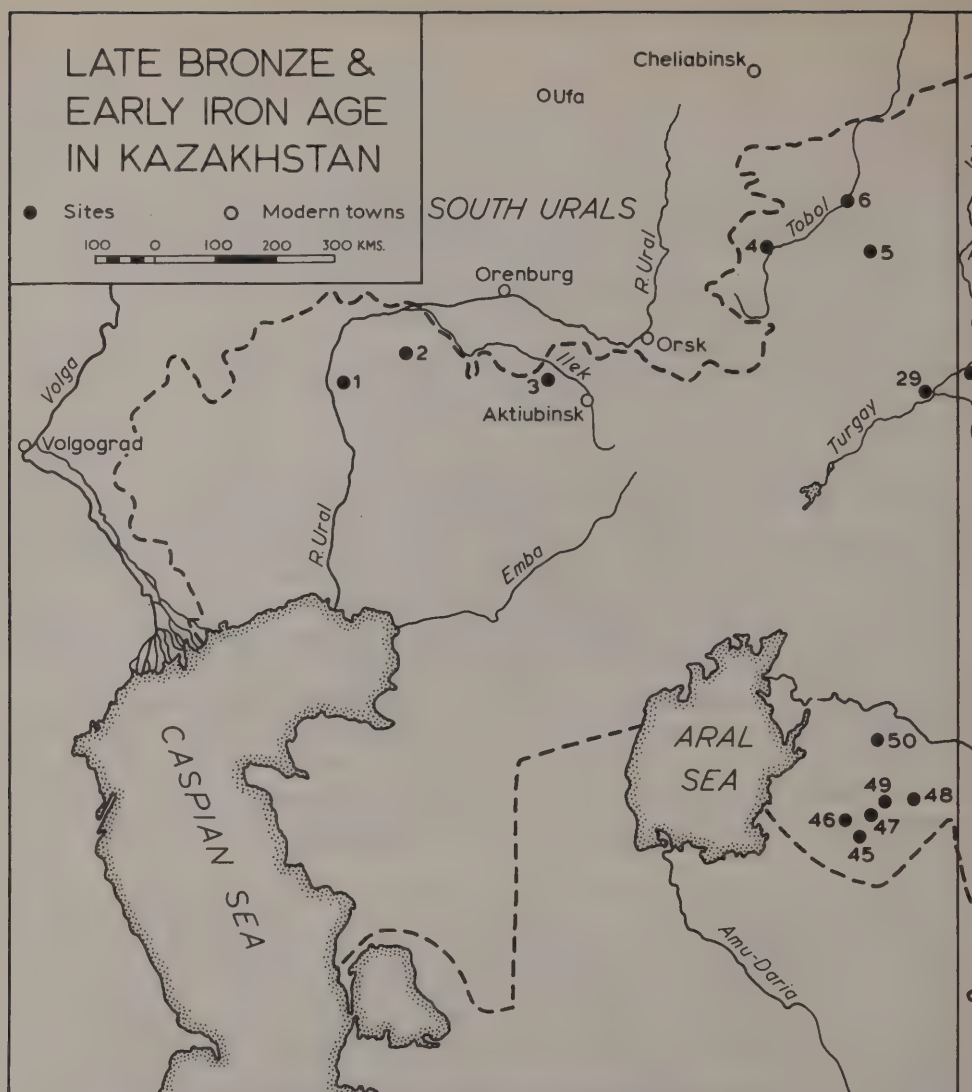
(A Guide to the Recent Literature on the Subject)

by T. SULIMIRSKI

The present report on the archaeological literature in the USSR that appeared approximately between 1961 and 1975 is the seventh in the series and is devoted to Kazakhstan, the huge, mainly steppe, country of nearly 1,060 thousand square miles, the greatest east-west extent being about 2,200 miles and the greatest north-south about 1,100 miles. This report was intended to deal with the literature of both Kazakhstan and Soviet Central Asia but the volume of the actual archaeological literature of this period being too large to be reviewed in this volume, that concerned with Central Asia has been deferred to the next issue of the *Bulletin*. As previously, only books, pamphlets and periodicals accessible in the main archaeological libraries in London were considered and they have been handled in about the same way as formerly. It should be mentioned that some of the publications quoted in my report on the Late Bronze Age and Earliest Iron Age in the USSR (*Bulletin* 8-9, 1970, 117) often relate to the area under review and I have had to

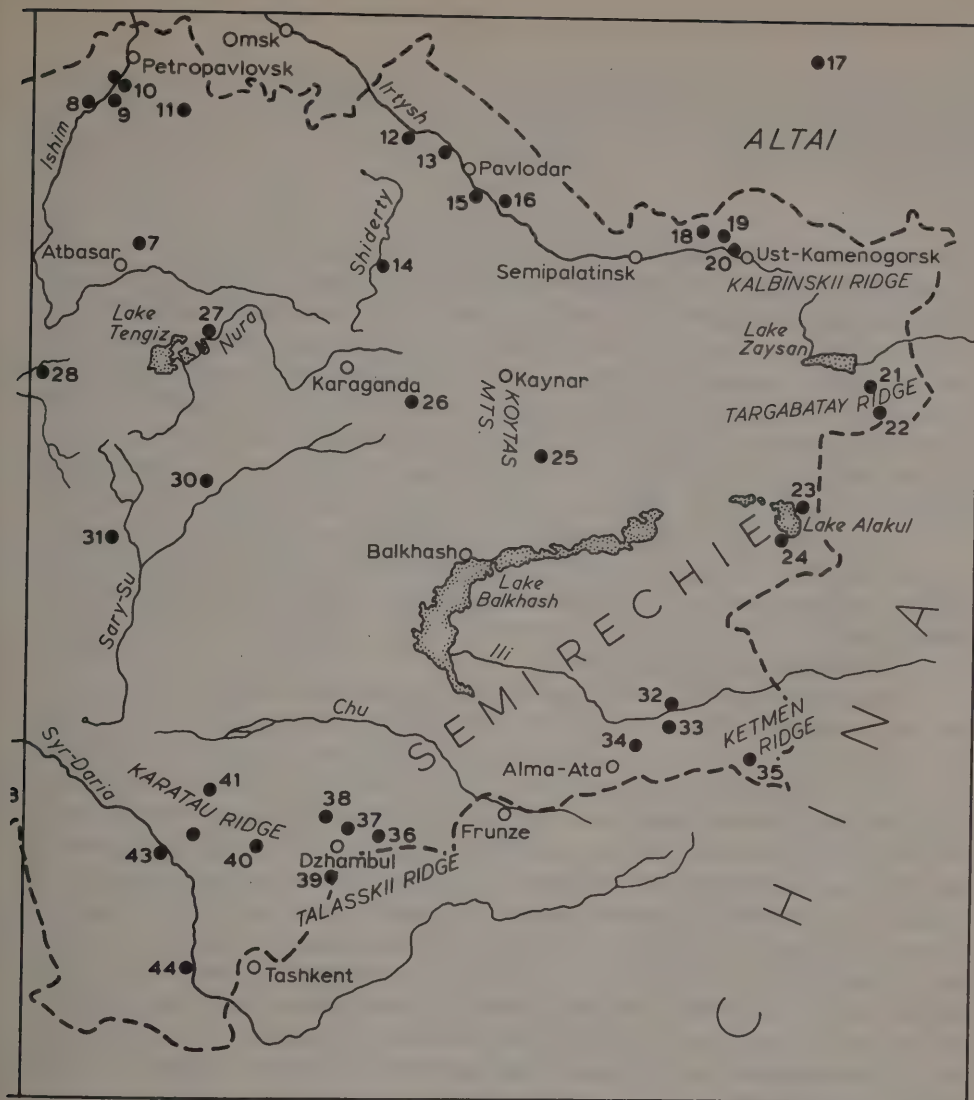
* In this article the following are the chief abbreviations used:

AIK	<i>Arkheologicheskie Issledovaniya v Kazakhstane</i> , Alma-Ata 1973.
AO	<i>Arkheologicheskie Otkritiya</i> , Moscow.
ASE	<i>Arkheologicheskii Sbornik</i> , Hermitage, Leningrad.
Bulletin	<i>Bulletin of the University of London Institute of Archaeology</i> .
IANK	<i>Izvestia Akademii Nauk Kazakhskoy SSR</i> , Alma-Ata.
IANT	<i>Izvestia Akademii Nauk Tadzhikskoy SSR</i> , Dushanbe.
IMKU	<i>Istoriya Materialnoy Kultury Uzbekistana</i> , Tashkent.
KDSZK	<i>Kultura Drevnikh Skotovodov i Zemledeltsev Kazakhstana</i> , Alma-Ata 1969.
KSIAM	<i>Kratkie Soobshcheniya Instituta Arkheologii AN SSSR</i> , Moscow.
KSIIMK	<i>Kratkie Soobshcheniya Instituta Materialnoy Kultury</i> , Moscow.
MIA	<i>Materialy i Issledovaniya po Arkheologii SSSR</i> , Moscow.
NAK	<i>Novoe v Arkheologii Kazakhstana</i> , Alma-Ata 1968.
PRK	<i>Poiski i Raskopki v Kazakhstane</i> , Alma-Ata 1972.
Rapports	<i>Les Rapports et les Informations des Archéologues de l'URSS, VI Congrès International des Sciences Préhistoriques et Protohistoriques</i> , Moscow 1966.
SA	<i>Sovetskaya Arkheologiya</i> , Moscow.
SDKK	<i>Po Sledam Drevnikh Kultur Kazakhstana</i> , Alma-Ata 1970.
SE	<i>Sovetskaya Etnografiya</i> , Moscow.
TIIAEK	<i>Trudy Instituta Istorii, Arkheologii i Etnografii Akademii Nauk Kazakhskoy SSR</i> , Alma-Ata.
TKhAEE	<i>Trudy Khorezmskoy Arkheologo-Etnograficheskoy Ekspeditsii</i> , Moscow.
VDI	<i>Viestnik Drevney Istorii</i> , Moscow-Leningrad.
VGV	<i>V Glub Vekov</i> , Alma-Ata 1974.



The List of Numbered Sites on the Map

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| 1. Site on Lake Chalkar. | 13. Zhol-Kuduk. |
| 2. Lebedevka. | 14. Tasmola. |
| 3. Syn-Tas; Besova. | 15. Akmola. |
| 4. Pereleski; Konezavod. | 16. Leontievka. |
| 5. Semiozerno. | 17. Berezovka in the Altai country. |
| 6. Kustanay; Alekseevskoe. | 18. Kamyshinka; Chistiy-Yar. |
| 7. Zhabay-Pokrovka; Sargary. | 19. Zevakino; Trushnikovskoe. |
| 8. Petrovka. | 20. Predgorodnoe. |
| 9. Iavlenska; Pokrovka on the Ishim. | 21. Zaisan. |
| 10. Novonikolskoe; Bogolubovo. | 22. Chiliktinskaya valley. |
| 11. Oktiabrskoe-Chaglinka. | 23. Arasan and Dzarbulak, both on Lake Alakul. |
| 12. Irtyshskoe. | 24. Alakul site. |



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| 25. | Sites in the mountains Katenemel. | 38. | Ak-Chulak; Uzun-Bulak. |
| 26. | Bylkyldak; Taldy. | 39. | Karaul-Tobe; Dzharly-Tobe. |
| 27. | Zhylandy; Samarskoe. | 40. | Karasha. |
| 28. | Kara-Oba-Arkalyk. | 41. | Uyuk. |
| 29. | Amageldy. | 42. | Tau-Tary. |
| 30. | Dzhanaydar; Zaman-Uzen. | 43. | Aktobe. |
| 31. | Dzhezkazgan. | 44. | Chardara. |
| 32. | Besshatyr and sites on the Ili. | 45. | Tas I on the Inkara-Daria. |
| 33. | Dzhuvantobe-Chilik. | 46. | Chirik-Rabat. |
| 34. | Issyk. | 47. | Sengir-Kala. |
| 35. | Ak-Tash; Kegen site. | 48. | Uygarak. |
| 36. | Kyzyl-Kaynar. | 49. | Tagitsken. |
| 37. | Kyzyl-Kaynar-Tobe; Korolevka. | 50. | Dzhety-Asar on the Kuvan-Daria. |

refer to these again. This report cannot, therefore, be regarded as a review of the entire literature defined above, as several important works and publications on the theme, and especially local periodicals, were not available in London.

Publications of a general character

A fine book by the late Professor M. I. Artamonov, *Sokrovishcha Sakov* (*Treasures of the Saka*, Moscow 1973, subtitled 'The Amu-Daria Treasure, Altai Barrow Graves, Minusinsk Bronzes, Siberian Gold', 280 pages, 306 illustrations many in colour, summary in English) deals with the works of art of the Asiatic 'Scythians', the Sacians, and of other Siberian peoples, and with similar finds from the whole of Soviet Asia and from outside that area. He briefly discussed the origin and background of Sacian art and its relation to Oriental civilisation. In an article preceding the publication of this book (*SA* 1971-3, 40-57), the chronology of the 'Scytho-Siberian Gold', an integral part of the items presented in the volume above, has been discussed by the same author and reasons were given for re-dating the important Siberian Collection in the Hermitage Museum in Leningrad.

In this context a semi-popular paperback by M. I. Artamonov, *Kimeriytzy i Skify* (*Cimmerians and Scythians*, Leningrad 1974, 156 pages, with a large bibliography on the subject), should be mentioned although only a few marginal notes are devoted there to topics relating to the area under review.

Topics connected with the Sacian peoples during the whole period of their development from the 10th to the 1st centuries BC, have been discussed in the article Saki Aziatskie i Skify Evropeyskie — Obshchee i osobennoe (Asiatic Sacians and European Scythians — their similarities and differences, *AIK* 1973, 43-58) by K. A. Akishev. Questions relating to the origin of these peoples and their migrations have been dealt with, as have Sako-Scythian relations and the relations of the Sacians with the native peoples in various countries in Central Asia. The chronology of their development in subsequent stages and their synchronism with other peoples of the area are illustrated in a special graph, though the initial dates for both the Sacian and Scythian cultures have evidently been inflated on this. In another article I. V. Pyankov (*IANT* 3, 1968, 12-19) briefly discusses the meaning of the name 'Sacae' (Sacians, Saki, etc.). The Greeks and Persians called by that name the Central Asiatic Iranian nomads and Herodotus (VII, 64) says that 'the Sacae who are Scythians'. The author concludes that the term may be used narrowly to denote the Asiatic branch of the people or in a wider meaning to denote all 'Scythians', whether in Asia or in Europe.

M. A. Itina (*KSIAM* 122, 1970, 49-53) discusses the history of the steppe country extending between the two Central Asiatic rivers, the Amu-Daria and Syr-Daria, from the third millennium BC to the early first millennium AD. She points to a steady influx in that area of steppe nomads from the region of the Southern Urals which stimulated a gradual development of their culture and their progressive imposition of a higher civilisation.

An important study of a general character is Slozhnye luki evraziyskikh stepey i Irana v Skifo-Sarmatskuyu epokhu (The Composite Bows of the Eurasian Steppes and Iran in the Scytho-Sarmatian Age), in the work *Materialnaya kultura Narodov Sredney*

Azii i Kazakhstana (Moscow 1966, 29–44) by A. M. Khazanov, already mentioned in my report in *Bulletin* 10 (108). It is devoted to the history of the development of the Scythian composite bow, its characteristics, efficiency and its geographical extent. Then the history has been sketched of the formidable 'Hunnic' bow, strengthened by bone inlays; it appeared in Asia at the turn of the Christian era, and the consequences of its introduction have been pointed out. The different types of arrows and their points have also been discussed and the tactics of the mounted archers armed with bows of different types have been explained. The same author, in a short article (*SA* 1970–2, 273–276) discussed some problems relating to the composite bow and its use and disputes some of G. Rausing's views contained in his work *The Bow. Some Notes on its Origin and Development* (Bonn-Lund 1967, Acta Archaeologica Lundensis 6). Mention should also be made of two articles by V. A. Litvinskii, one (*SA* 1965–2, 75–91) devoted to Middle-Asiatic iron arrowheads, their typology and chronology; they appeared in the 7th–6th centuries BC and their evolution may be followed up to the 5th–7th centuries AD; the other (*SA* 1966–4, 51–59) is devoted to the study of the development of the eastern bow. This article and a parallel one by A. F. Medvedov (*KSIAM* 102, 1964, 3–7) were referred to by me in *Bulletin* 10 (108). Two articles by I. N. Medvedskaya are relevant in this context; a preliminary one (*KSIAM* 119, 1966, 62–64) on the history and origin of iron tanged arrowheads in Central Asia and the other (*SA* 1972–3, 76–89) on the origin and chronology of bronze arrowheads in Central Asia and Kazakhstan, with a sketch map showing the diffusion of their various types in that area. Her results are in agreement with my own, published in *Artibus Asiae* XVII (1954, 308–313).

Another important study by A. M. Khazanov of a rather general character is *Ocherki Voennogo Dela Sarmatov* (*Essays on the Military Art of the Sarmatians*, Moscow 1971, 172 pages) in which the various types of Sarmatian armature have been described and their efficiency discussed; about one third of the text of the book is devoted to the military art, tactics, and their changes. The author distinguishes two main periods in Sarmatian warfare. Characteristic of the later period is, in the main, the use of the armoured cavalry (the *cataphracti*) and a special section of the book is devoted to its development and to its significance. The work was preceded by an article by the same author (*SA* 1970–2, 52–63) which set out the main ideas of the book. The work was favourably reviewed (*SA* 1973–2, 52–63) in part by E. V. Chernenko and in part by V. B. Vinogradov and V. A. Petrenko.

The question of when the heavy cavalry was formed and the country in which this development took place has often been discussed. E. V. Chernenko, in the article *O vremeni i meste poyavleniya tyazheloy konnitsy v stepyakh Evrazii* (About the time and place of the appearance of the Heavy Cavalry in the Steppes of Eurasia, *MIA* 177, 1971, 35–38) points out that the widespread opinion of its Asiatic origin in the first centuries AD is erroneous. Its formation had already begun in the 6th century BC in ancient Scythia and the north-west Caucasus. This is attested by the quantity of armour, helmets, battle-belts and shields found in Scythian burials of the period from the 6th to 3rd centuries BC and it is presented by the author in a graph which shows the number of each

of the items mentioned above found in Scythia and the Caucasian area, dated to each of the consecutive centuries of the period in question. According to archaeological evidence, it is only since the 5th century BC that similar articles of the equipment of heavy cavalry began to appear in Sauromatian-Sarmatian burials, and only as late as the 4th century BC in Sacian-Massagetan graves in Central Asia. This data point to the north Pontic area and the north-west Caucasus as the original countries of the armoured cavalry; this is supported also by other circumstances discussed by the author.

In this context, the article by I. L. Kizlasov (SA 1973—3, 24 ff.) in which the very disputable origin of stirrups has been discussed may be mentioned. The author points out that a kind of stirrup made of leather straps, wood, or other organic material, appeared first in the 4th—3rd centuries BC (e.g. Chertomlyk barrow), and in some areas in the 2nd century BC but their wide use, in particular by the heavy cavalry (*cataphracti*) began only in the 3rd century AD.

E. E. Kuzmina (VGV 1974, 16—24) calls attention to pedestalled clay bowls of the Late Bronze Age found within a large area — Kazakhstan, western Siberia, the Middle Urals. They all date from a relatively short period, the turn of the second and first millennia BC, and were everywhere found exclusively as the only vessel of this type within the given group of finds. Such vessels, wheel-turned and somewhat differing from the northern ones, were also found in Soviet Central Asia, Turkmenia and ancient Bactria. By the end of the Late Bronze Age pedestalled bowls went out of favour and lasted longer only in the Tagarskaya culture in Siberia. Their small number suggests that they probably served some ritual purpose. It seems that some metal vessels owe their shape to them and that they influenced the shaping of Scythian copper cauldrons which emerged approximately at the time of the decline of their clay prototype. It may be mentioned that the Sarmatian bronze cauldrons and their manufacture were the theme of a study by E. K. Maksimov (SA 1966—1, 51—60).

The history, typology and purpose of the so-called 'chandeliers' in the shape of a bronze tray, round or square with raised edges and usually on short legs, were discussed by T. N. Senigova (SA 1968—1, 208—225). They were found mostly in Semirechie (East Kazakhstan) during the period from the 6th century BC to the 14th century AD. They were often decorated with bronze figurines of riders or of various animals affixed on the rim. They undoubtedly served some cult purpose.

Petroglyphs

In my previous report (*Bulletin* 12) a special section was devoted to the petroglyphs recently recorded in the mountains of Siberia and Soviet Far East. At the same period a large number of petroglyphs have been discovered in the mountains of the eastern part of Kazakhstan and in other countries of Central Asia. They have been photographed and copied and reports have appeared in subsequent issues of the *AO*. On the whole the themes and style of the petroglyphs of the same period do not much differ from each other in spite of having appeared in widely separated areas; however, there are noticeable differences between petroglyphs of different ages. The petroglyphs depict single human

or animal figures (such as wolves, chamois, stags, bucks, boars etc. or domesticated species such as horses, dogs, camels, etc.) and there are also hunting scenes, wolves attacking groups of chamois, sacred dances, ploughing with a wooden plough drawn by horses or a camel, etc. Of special interest are scenes of putting horses to a cart and horses, or exceptionally camels, put to a chariot. In Kazakhstan the latter were found in a few sites in the Karatau Ridge and other ridges near the border with Kirgizia, and also in the mountains of Kirgizia.

Many petroglyphs are situated in narrow valleys high up in the mountains, often on cliffs up to 4,000 m. above sea level, and therefore difficult for access. They usually form larger groups, some consisting of up to 1,000 drawings, and quite frequently they appear in larger accumulations of such groups at a distance of five or more kilometres from each other. Their dates range from the middle or second part of the second millennium BC to nearly the recent past; they evidently had some religious or magic purpose, but at the same time were an expression of the artistic feeling of their makers. But in some cases single animal figures, especially those of the ibex, seem to have been used as a target for acquiring skill in bow shooting, or in spear launching, as shown by P. I. Marikovskii (*SDKK* 1970, 290–292), who wrote on a series of petroglyphs from the Karatau Ridge.

To start a brief review of the petroglyphs of Kazakhstan, we shall deal first with the north-easternmost of them, those in the Kalbinskii Ridge close to the southern border of Siberia, south-east of Semipalatinsk, reported on by Z. S. Samashev and V. K. Kulik (*AO* 1974, 293 f.). In the same report the discovery was announced of another group of petroglyphs, in the Tarbagatay Ridge, about 250 km. south of the Group mentioned above. The Kalbinskii petroglyphs, mostly of the Christian era, have also been reported by V. P. Kurylev (*AO* 1973, 470 f.). Of particular interest are petroglyphs described by L. A. Chlalaya (*AO* 1973, 475) discovered in the Koytas Mountains, c. 30 km. from Kaynar and 250 km. south-west of Semipalatinsk, on the western border of the Semipalatinsk oblast. About 230 figures of men and various animals have been found there on rocks within a distance of 3 to 4 km., and also 77 scenes of ritual dances, hunting and catching elk. Petroglyphs in the Karatau Ridge in southern Kazakhstan, already mentioned above, were reported by M. K. Kadyrbaev and A. N. Mariashev (*AO* 499–501; *AIK* 1973, 128–145). They dated from about 1,000 BC to the first millennium AD. There are scenes with camels put to two-wheeled carts, and horses put to four-wheeled vehicles. V. E. Sokolov (*SA* 1963–4, 199–204) described petroglyphs of Talasskii Ridge close to the Kirgizian border west of Alma-Ata; and A. S. Amanzholov (*IANK* 5, 1966, 79–96) publishes on nine plates petroglyphs from several sites in the Ketmen Ridge east of Alma-Ata, near the meeting point of three borders, of Kazakhstan, Kirgizia and China. They represent the usual series of human and animal figures and scenes as known from other sites in these mountains. Their dates range from the Bronze Age to the Middle Ages. Petroglyphs on rocks along the right bank of the river Boba-Ata near Aktobe have been described by T. N. Senigova (*TIIAEK* 14, 1962, 82–97), who dated them from the 6th–5th centuries BC to the 6th–8th centuries AD. Among the figures represented were camels, ibex and other animals.

Kazakhstan in general

The book *Naselenie Kazakhstana ot epokhi bronzy do sovremennosti* (*The Population of Kazakhstan from the Bronze Age to the Present*, Alma-Ata 1970, 240 pages, summary in English) by O. Ismagulov, presents the results of palaeoanthropological study of the available material from the Bronze Age to the present, divided into six periods: the Bronze Age — 17th to 6th centuries BC; the Sacian period — 7th to 4th centuries BC; the Usuni period — 3rd century BC to 4th century AD; the Turcic period — 6th to 11th centuries AD; the Mongol period — 12 to 15th centuries; and the last, the present time, which began in the 16th century. A few maps illustrate changes in the anthropological set-up of the country during the entire time under review. According to the author, the Bronze Age population of Kazakhstan was of the Europoid type, closely related to that of South Siberia and the country on the Aral Sea, and at the same time akin to that of the European Yamnaya and Srubnaya (Timbergrave) cultures. An earlier article by the same author may be mentioned here (*TIIAEK* 18, 1963, 153–173). It is devoted to the palaeoanthropology of Kazakhstan in the Bronze Age. Cranial measurements of the material from that country are shown on a series of graphs and compared with similar material from other areas.

Furthermore of a general character are a series of small books, some of them paperbacks, published under various titles. They contain up to about twenty brief reports written mainly in Russian by different authors on the results of their more important recent archaeological research and excavations in the country; some also contain articles of a more general character. The books, published by the Academy of the Kazakhstan SSR in Alma-Ata, have appeared every year since 1968. The ones of which account has been taken here are: *Novoe v arkheologii Kazakhstana* (*Novelties in Kazakhstan Archaeology*, Alma-Ata 1968, 160 pages, 11 articles by 12 authors) ed. M. K. Kadyrbaev; it was reviewed by S. S. Chernikov (*SA* 1970–4, 258–260). *Kultura drevnikh skotovodov i zemledeltsev Kazakhstana* (*The Culture of Ancient Stockbreeders and Farmers of Kazakhstan*, Alma-Ata 1969, 196 pages, 14 articles by 17 authors) editor K. A. Akishev. *Po sledam drevnikh kultur Kazakhstana* (*Traces of Ancient Cultures of Kazakhstan*, Alma-Ata 1970, 294 pages, 22 articles by 24 authors), editor M. K. Kadyrbaev. *Poiski i raskopki v Kazakhstane* (*Research and Excavations in Kazakhstan*, Alma-Ata 1972, 216 pages, 17 articles by 17 authors) editor K. A. Akishev. *Arkheologicheskie issledovaniya v Kazakhstane* (*Archaeological Investigations in Kazakhstan*, Alma-Ata 1973, 208 pages, 15 articles by 16 authors) editor K. A. Akishev. *V glub vekov* (*In the Depth of Centuries*, Alma-Ata 1974, 224 pages, 15 articles by 17 authors) editor K. A. Akishev.

A few of the articles published in the booklets above tackle problems of a rather general character. One of these is *Nekotorye itogi i perspektivy izucheniya arkheologii rannezheznogo veka Kazakhstana* (Some results and prospects of the study of the Early Iron Age Archaeology of Kazakhstan, *NAK* 1968, 21–36) by M. K. Kadyrbaev. This is a brief review of recent investigations chiefly of Sacian barrow graves, which form the largest group of archaeological remains in all parts of the area. Their grave goods, in particular weapons and horse gear, and their chronology have been discussed, as were also chrono-

gical and regional differences of Scian sepulchral constructions under the mounds, and of some types of sepulchral pottery. Thus bits with stirrup-shaped terminals appear in Kazakhstan graves of the 7th–6th centuries BC and the fact that over 250 specimens of this type have been recorded in Kazakhstan implies that this must have been their original country from which they later spread into Europe and other countries. In the pre-Scythian and Early Scythian periods they were unknown in Europe – including the northern Caucasus and Transcaucasia; neither do they appear in western Asia which, as well demonstrated by J. A. H. Potratz (1966) was the original area in which the metal bits and cheek-pieces were introduced as early as in the second millennium BC.

Another article is *K probleme proiskhozhdeniya nomadizma v aridnoy zone drevnego Kazakhstan* (The problem of the origin of nomadism in the arid zone of Ancient Kazakhstan, *PRK* 1972, 31–46), by K. A. Akishev. According to the author, stockbreeders of the country took to nomadism in the period 9th–7th centuries BC, during which a system of nomadic pastoralism gradually evolved. The author discussed the circumstances in the country during the earlier periods providing the background to this development.

The article *Gornoe delo v Tsentralnom Kazakhstane v drevnie i srednie veka* (Mining in central Kazakhstan in Ancient and Middle Ages, *PRK* 1972, 3–30) by A. Kh. Margulan treats a different theme. Traces of ancient mining activities, that go back to the turn of the third and second millennia BC, have been discussed including the tools and other articles found in sites, the mining technique and the smelting of ores. Another article by the same author, *Dzhezkazgan – Drevnii metallurgicheskii tsentr – Gorodishche Mily-Kuduk* (Dzhezkazgan, the ancient metallurgical centre – earthwork Mily-Kuduk, *AIK* 1973, 3–42) is devoted to this earthwork, which is situated in central Kazakhstan; in the prehistoric past it must have been a very large and important metallurgical centre that worked for a very wide market. The earthwork in the centre of Dzhezkazgan extended over the area of about ten hectares. Traces were found there of many huts, workshops, furnaces and also traces of exploitation of ores of various metals, including copper and iron. Stratigraphic evidence shows that the centre was in existence from the Bronze Age to the Middle Ages.

A. K. Akishev (*SDKK* 1970, 69–78) points out that according to the archaeological evidence and historical records, the Usuni of Semirechie (East Kazakhstan) were settled farmers. The knowledge of agriculture reached there by the end of the first millennium BC, owing mainly to the influence of the prosperous agriculture of the oases of east Turkestan, central Asia and China. But it fully developed in that region only in the 3rd and 4th centuries AD, jointly with the development there of horticulture and fruit gardening.

A different theme is dealt with by S. A. Semenov in his article published in the appendix to the paperback *Zagadka Zolotogo Kurgana* by S. S. Chernikov (Moscow 1965, 156–177) dealt with further below. He reports on the results of his macro- and micro-analyses and of his study of articles of adornment, in particular gold jewellery and turquoise beads found in barrow grave No.5 of the Chiliktinskaya valley in east Kazakhstan. He also discusses there the methods of their manufacture, which no doubt generally apply

to other similar workshops in the country, and considers the sets of instruments indispensable for the manufacture of jewellery and other adornments. The author points out that gold ores have been found in several regions of Kazakhstan and were exploited in antiquity. Gold ornaments from barrow grave 5 mentioned above, as those found in other graves of the site, must have been the work of local goldsmith-masters.

It may be added that a general review of archaeological publications that appeared during the time of Soviet rule over Kazakhstan, up to about 1966, has been done by K. A. Akishev (*SA* 1967—4, 62—78).

Western Kazakhstan

There are only a few reports on excavations in this area and these are mainly of Sauromatian-Sarmatian barrow graves. The mounds, met chiefly in the steppe of the northern part of the country, formed part of larger burial grounds.

The westernmost area investigated extends eastwards of the river Ural up to the Ileik. According to M. G. Moshkova and her two associates (*AO* 1969, 394—396), about 40 burial grounds have been recorded there, each consisting of up to 30 mounds. Four mounds of a Sarmatian barrow grave cemetery that lay close to the small Lake Chalkar were excavated, each containing a few burials. In one a Sauromatian grave of the 5th century BC was found, and in another a burial of a 'late nomad' of the time around AD 1000 was uncovered, but for the most part graves were of the 4th century BC. A few years later, as reported by B. Kushaev (*AO* 1971, 498 f.) four other mounds were excavated in the cemetery Chalkar III situated in the same area, on a height called Santas. They were of the Prokhorovka culture of the Early Sarmatian period (4th—3rd centuries BC). Further east, at Lebedevka, district of Chingirlau, a small barrow grave cemetery was investigated by G. I. Bagrikov and T. N. Senigova (*IANK* 1968, 71—89). Its burials were of the 2nd to 4th centuries AD, but also of the 14th century AD; all were richly furnished with silver personal ornaments evidently made by well qualified master-artisans, a variety of crystal, amber, paste, etc. beads, cauldrons, pottery etc. The authors emphasise that the high standard of the jewellery found in this cemetery was the outcome of local developments in the 5th—4th centuries BC, but it was not the result of any influence of the Goths or Huns. Imported Greek articles, mainly Bosphoran made, were also found there.

Still further east, at Syn-Tas in the Aktiubinsk oblast, on the left bank of the Ileik south of Orenburg, six large mounds were excavated. As reported by M. K. Kadyrbaev (*AO* 1974, 489—491) a grave has been discovered which was probably that of a Sauromatian chief guarded by three fully armed warriors. The sepulchral equipment consisted of quivers full of arrows, of iron akinakes daggers, various utensils, some of bone with a carved zoomorphic decoration, horse bridloons, etc., all of the 5th century BC. At Besova, in the vicinity, burials were similarly equipped, but of special interest was a richly furnished burial in barrow grave No.3 of a priestess of the 5th century BC. In other graves pottery was found typical of the 5th—4th centuries BC. Further east, 21 km. east of the Katyn-Asyr Ridge the region within which the Sauromatians from the west contacted the Tasmola tribes in the east had already been extended.

Northern Kazakhstan

During the time dealt with here, investigations and excavations in Northern Kazakhstan have been undertaken in three distinct regions of the country. First, they were conducted in the area of Pavlodar on the Irtysh. Thus E. I. Ageeva and A. G. Maksimova (*TIIAEK* 7, 1959, 32 ff.), in a report already quoted previously (*Bulletin* 7, 77 f.) in connection with the remains of an earlier period, announce the results of excavation of a barrow grave cemetery at Zhol-Kuduk on the left bank of the Irtysh. It consisted of 19 small mounds of the period 6th to 4th centuries BC and is attributable to the 'Early Nomads'. Skeletons, in shafts some with a small niche, were supine with heads to west. Graves were poorly furnished; some had a bronze mirror with a small loop, some had paste beads, in one instance about 200 specimens; in some graves sandstone plates with the edge raised ('altars') were found, and sheep bones were a frequently met grave-good. A few Early Sarmatian mounds at Irtyshskoe, in the vicinity, were also investigated and there all the graves were poorly furnished and most showed signs of having been excavated previously.

Another cemetery of the Early Nomads was investigated in the same region at Leontievka, situated on the right bank of the Irtysh, about 70 km. up river from Pavlodar. As reported by F. Kh. Arslanova (*IANK* 2 (19), 1962, 76-93), nine mounds out of a group of 12 were excavated; five of these were of the 4th to 2nd centuries BC and four were of the 9th to 11th centuries AD. Skeletons were supine, heads to west or north. Vessels found in the graves represent types proper to Sarmatian burials of West Kazakhstan and of the country of the lower Volga, but some call to mind some vessels of the Usuni culture of Semirechie in East Kazakhstan, and also those of the Biisk culture of the Altai country. Metal articles point to similar connections, but at the same time exhibit close links with similar artifacts of the local culture of the preceding period. Craniological material gathered at the cemetery shows, according to O. Ismagulov (*IANK* 1967, 3, 61-71), many features in common with that from the Zhol-Kuduk cemetery of the 6th to 4th centuries BC, dealt with above, and with the material from other cemeteries of the same region, and from East Kazakhstan of the subsequent period, the 3rd to 1st centuries BC. Also similar was the craniological material from cemeteries of the valley of the river Ili, that from Sarmatian burials on the Lower Volga and that from the Berezovka cemetery in the Altai country, all of the period from the 3rd to 1st centuries BC. An admixture of Mongoloid elements is well distinguishable in the material from Leontievka, as in that from the Altai country (Berezovka) and the valley of the Ili in Semirechie.

A large, important cemetery was excavated by M. K. Kadyrbaev (*IANK* 1 (18), 1962, 70-83) at Tasmola situated on the right bank of the steppe river Shiderty, 8 km. south-west of the Sovkhoz Ekubastuzskii district of Kuibyshev, Pavlodar oblast, close to the northwards bend of the river. There were jointly 36 burial constructions which extended over a distance of 450 m. eastwards from the river in a relatively narrow strip. There were Bronze Age Andronovo communal burials of the *ograda* (stone-fenced) type, and a number of barrow graves which appear mainly at the eastern end of the cemetery, six of which were excavated. A number of barrow graves with stone fences were of a later

period. The earthen mounds were mainly of the Early Scythian period. Burials were supine in shafts, heads to north and once a slab cist was found. Their equipment was of the 'archaic' Scythian type, mainly of the 6th century (or late 7th—6th centuries BC according to the author). It consisted of pottery, bronze mirrors with raised rim and a small loop in the centre, a variety of beads, buckles, iron knives, 'stone altars' (oval plates with the edges raised). Once a horse skull was found with remains of its bridoon and there were bronze bits with stirrup-shaped terminals, cheek-pieces of archaic type, etc. According to the author 160 specimens of such bits were found in Kazakhstan, which implies their local origin in that country. In the west they appeared only by the middle of the 6th century. Many grave goods were similar to those known from the Maiemirskaya culture of the Altai country, but others that differ imply that the cemetery of Tasmola belonged to a different cultural group. Noteworthy is the fact that the best equipped burial (Barrow No.19) was of the type 'with whiskers' proper to Central Kazakhstan; this is the north-easternmost barrow of this type known so far.

Another region of intensive archaeological investigation was the northernmost part of North Kazakhstan, mainly in the area along the Ishim south of Petropavlovsk. Since 1967 this investigation has been undertaken mainly by G. B. Zdanovich, often with one or two associates. In 1967 15 settlements of the Bronze Age situated on the western, left, bank of the Irtysh were recorded and seven barrow graves at Iavlenska (*AO* 1968, 404—406), dating to the early centuries AD, were excavated. Brief reports on the investigation in the same region of a few settlements were published by G. B. Zdanovich (*AO* 1969, 392 f.; 1970, 404—407), and also recorded were a few barrow grave cemeteries there. However, the main excavation undertaken by him was that of a stratified settlement at Novonikolskoe on the Ishim, 50 km. south of Petropavlovsk (*AIK* 1973, 113—127), where 20 semi-pit-dwellings have been investigated and four stages distinguished in their existence, the settlement being of the Bronze and Early Iron Ages. Pottery of the same type as that found in the settlement has also been excavated in the earthwork of Bogolubovo situated nearby on the left bank of the Ishim, 40 km. south of Petropavlovsk.

In a series of later reports, G. B. Zdanovich gives account of his subsequent investigations in the same area. Thus at Petrovka, 90 km. south of Petropavlovsk, a settlement was investigated on the left bank of the Ishim (*AO* 1971, 496). In the same report an account was given of the excavation of seven barrow graves that contained ten burials, at Pokrovka situated on the other, right, bank of the Ishim. Three barrow graves were looted. The earliest burial was of the Early Sarmatian period, but its contents exhibited marked Andronovo characteristics. The two latest burials were of the Late Sarmatian period, the 3rd to 5th centuries AD. Their description has been published by G. B. Zdanovich (*KDSZK* 1969, 69—79), who also excavated two settlements and burial grounds situated further to the south, at Pokrovka district of Atbasar, namely at site Zhabay-Pokrovka, and at site Sargary, also on the river Zhabay at Pokrovka, about 30 km. north-east of Atbasar (*AO* 1971, 496 f.; 1972, 447—449; 1973, 469; 1975, 488 f.).

The larger settlement, at site Zhabay-Pokrovka, was of the Late Bronze Age. In its remains a few vessels were found of the Karasuk type, but more striking was one of its nine

pit-dwellings, which was 9 to 15 m. wide and 55 m. long. Six sheep skulls and a skeleton of a lamb were found under its walls and they imply that the dwelling must have had some cult purpose. In three dwellings bronze arrowheads, a bronze dagger, moulds, needles and awls were found. A 'flat' cemetery lay near the settlement and all its graves were robbed. Seven barrow graves of the 7th–6th centuries BC were also excavated there. In the other site, Zhabay-Sargary, three barrow graves of the Early Iron Age were investigated as was also a settlement of the Late Bronze Age, in which 13 semi-pit-dwellings were found. A 'flat' cemetery nearby evidently belonged to the settlement.

At Oktiabrskoe on the Chaglinka, some 150 km. south-east of Petropavlovsk, a settlement of the Late Bronze Age, the late 2nd and early 1st millennia BC, was investigated by K. A. Akishev (*AO* 1966, 291–300; 1967, 291 f.) and A. M. Orazbaev (*SDKK* 1970, 129–146; *PRK* 1972, 154–162). Its huts were mainly pit-dwellings or semi-pit-dwellings and some were built on the ancient surface of the ground. Sixteen huts were figure-of-eight in plan, being double-chambered. From the reconstruction drawings the huts in their plan and construction appear to have been of the same type as the modern winter-huts (*zimovka*) of the Kazakhs and this fact implies the survival of a tradition which goes back to the Bronze Age. Near the settlement was a barrow grave cemetery of the same period, evidently the burial ground of the ancient inhabitants of the village. The study by L. A. Makarova (*SDKK* 1970, 269–276) revealed that 686 fragments of animal bones collected in the remains of the settlement of Chaglinka were chiefly of domesticated animals, and only a few belonged to wild beasts. Cattle were of a race taller than those proper to Central Asiatic settlements; horses seem to have been similar to those of a local wild species. 51% of bones belonged to sheep.

The third, the least investigated, area extended over the south-western part of northern Kazakhstan, mainly south of Kustanay. According to V. V. Evdokimov (*AO* 1970, 207; 1971, 287–289, jointly with L. N. Logvin; 1973, 467) a settlement of the end of the Bronze Age at Konezavod, on the right bank of the Tobol, was investigated together with another one at Pereleski, on the left bank of that river, about 150 km. south-west of Kustanay. Four barrow graves of the Alakulskii period of the Andronovo culture were also excavated there, although a secondary burial found was of the 6th–5th century BC. Pottery of the Pereleski settlement was akin to that found in Transural country and in Kazakhstan sites in that area of the early first millennium BC. In 1971 excavation of another Bronze Age settlement at Semiozernoie had started; the site lay about 90 km. south-east of Kustanay.

In this context it may be mentioned that according to the results of the study of pottery from the settlement at Alekseevskoe on the Tobol near Kustanay by T. M. Potemkina (*SA* 1975–1, 35–50), the two groups distinguished several years ago by their excavator, O. A. Krivtsova-Grakova, in fact belonged to two distinct, subsequent periods in the existence of the settlement, the later one being of the Late Bronze Age.

Further in the south-east, near Amangeldy, nine barrow graves of the Early Iron Age were excavated by G. B. Zdanovich (*AO* 1970, 404–407) and at Kara-Oba, 27 km. from Arkalyk, where 15 stone cairns were excavated by K. A. Akishev (*AO* 1966, 291–300).

In the centre of that cemetery, which consisted of 87 barrow graves, was a large mound 'with whiskers'. Only a few grave-goods were found, including a bronze mirror and a stone oval 'altar', bone needles and piercers.

Central Kazakhstan

M. K. Kadyrbaev, in his article *Pamyatniki rannykh kochevnikov Tsentralnogo Kazakhstana* (Remains of the Early Nomads of Central Kazakhstan, *TIIAEK* 7, 1959, 162–200), gives a brief review of the most frequent and characteristic archaeological remains of the period from about 500 BC to about AD 500, from that huge country, and specifies their most distinctive chronological and regional features. The most spectacular are the so-called barrow graves 'with whiskers', that is large stone mounds to which two low elliptical stone walls were joined on their eastern side, about 20 to 500 m. long, and occasionally enclosing an area up to 150 m. wide; small stone cairns terminated both walls ('whiskers'). The gradual development of this type of grave and its importance for the establishment of a proper chronology of the relevant cemeteries in the country, has been discussed by A. M. Orazbaev (*KDSZK* 1969, 175–191) in connection with his report on the results of excavation of a barrow grave 'with whiskers' in the cemetery at Dzhanaydar in the central part of Central Kazakhstan. The large book *Drevnyaya kultura Tsentralnogo Kazakhstana* (*Ancient Cultures of Central Kazakhstan*, Alma-Ata 1966, 436 pages, profusely illustrated, provided with a chronological table) by A. Kh. Margulan, K. A. Akishev and M. K. Kadyrbaev, was not available in London. It deals with the prehistoric past of the country from the Bronze Age to the 3rd century BC.

A. Kh. Margulan (*SDKK* 1970, 164–199) reports on the important results of his investigation of the archaeological complex of Byklydak in the central part of Central Kazakhstan, at the foot of the Kara-Shoky Mountains in the valley of the Taldy-Nura, over 100 km. south-east of Karaganda, 50 km. north-east of Aksey-Aiuly. Six settlements of the Bronze Age have been recorded in that area, each with 30–40 dwellings in which lived local miners and stock-breeders. Nearby were three cemeteries consisting jointly of over 200 *ograde* graves, and of a number of barrow graves of the nomad stock-breeders, raised of stones, one being of the 'with whiskers' type. About 20, for the most part ransacked, graves were excavated but a description was given of five only. The burial ritual displayed by these burials and their sepulchral pottery were proper to the Andronovo culture, but they differ from other groups of the culture by their many local features. On the other hand, their similarity to the Andronovo remains of the Transural country was well marked. Almost exclusively small personal ornaments were found in graves, several of them of gold, but no weapons were found except for a few arrowheads. The grave goods imply the use of the cemeteries for a long period, which means that the settlement must have been in existence then. The earliest remains have been dated to the 14th to 12th centuries BC, and the latest ones to the Late Bronze Age. Of particular interest are single and segmented faience beads of Mediterranean origin a relatively large number of which were found in graves considered to have been among the earliest ones. Such beads were found in a few other sites in Kazakhstan, among them at Akmola and Zhol-Kuduk, sites dealt with in

this report. They were presumably acquired in exchange for gold and possibly also for copper mined in the region, which is very rich in metal ores (see my *Prehistoric Russia* 1970, 27 and *Bulletin* 7, 77).

Dzhezkazgan, recently dealt with by A. Kh. Margulan (*AIK* 1973, 3–42) was one of the main and earliest metallurgical centres of the country. The author devoted his study chiefly to its medieval activities (8th to 14th centuries AD), but he emphasises that the archaeological evidence shows that at the earthwork Milykuduk that formed the centre of Dzhezkazgan, copper ores were mined and copper smelted as early as the turn of the fourth and third millennia BC. It has been estimated that during the many centuries of the existence of the centre, over a million tons of copper ores have been mined there. He also quotes the literature concerned, chiefly the reports by K. I. Satpaev published in 1961, 1967 and 1970 at Alma-Ata that are not available in London.

Some results of investigation of the cemetery of the Andronovo culture and of the Early Nomads, situated in the same region at Taldy I, 5 km. east of Sovkhoz Nura-Taldy, Shetskii district, have been reported by M. K. Kadyrbaev (*PRK* 1972, 112–122). A number of its *ograde* graves with double stone-slab cists of the same type as those found by the same author at Kotaneme I north of the Balkash Lake, dealt with further below, deserve attention. M. K. Kadyrbaev describes also the results of his excavation (*AO* 1972, 450 f.; *VGV* 1974, 25–45) of a small cemetery of the Andronovo culture at Zhylandy on the Nura, 7 km. from Samarskoe in the Karaganda oblast. It consisted of stone fenced and covered *ograde* graves, and of two groups of barrow graves. Some burials were cremations, and their pottery differs to some extent from that of the inhumation burials, although both were of the Andronovo type. The two types of pottery have usually been found in the regions outside the one dealt with here, in burials of two periods subsequent to the Andronovo culture the Fedorovski and Alakulski periods. Here, however, graves that yielded the two types of pottery were found in the same cemetery and were co-eval. It follows that the people of the Fedorovskii and Alakulskii periods of the Andronovo culture must have mingled at Zhylandy, one of them coming from outside the area. Two female barrow graves of the Sacian period were also excavated. Their grave goods included a bronze mirror, stone 'altars', beads, etc. and analogies may be found in the remains of the first stage of the Tasmola culture (7th to 5th centuries BC) of Kazakhstan. The author remarks that female burials found in 'barrows with whiskers' usually had a similar equipment.

Finally, mention should be made of a report by N. Avanesova (*AO* 1972, 445) on the excavation of an Andronovo cemetery of the Alakulskii period (c. 14th century BC) at Zhaman-Uzen II, district of Zhana-Arkinsk, near Ortau, in the centre of Central Kazakhstan; it was situated on a tributary of the river Sary-Su.

O. Ismagulov (*SDKK* 1970, 251–268) presents the results of his study of the cranial material from barrow graves 'with whiskers' from Central Kazakhstan; he calls these 'barrows with stone lay-out'. Outside Kazakhstan such constructions have been found only in eastern Europe, in the Kalmuk SSR on the Caspian Sea. It is of interest to note that, in spite of a very long span of time of over 1,000 years (from the 7th century BC to

the 4th–5th centuries AD) during which barrows ‘with whiskers’ were constructed, they underwent no changes either in their plan or their form. In Table 1 the measurements are shown of cranial material from ‘barrows with stone lay-outs’ in central Kazakhstan; in Table 2 they are compared with the cranial material from cemeteries of the whole steppe territory in Asia and from the steppe country on the Dnieper in Europe. The conclusion is that the nomads buried in barrows ‘with whiskers’ were racially mixed, although their basis was the ancient Kazakhstan racial type related to that of east Kazakhstan. Noteworthy is the unexpectedly early – although only sporadic – appearance in the 5th to 3rd centuries BC of cranial deformation in central Kazakhstan. The author believes in social origins for the custom of burials in barrows ‘with whiskers’, and suspects that this type of grave construction could survive through several centuries thanks only to a stubborn keeping to the ancient tradition by a social class of the Saki-Usuni who buried their dead in them.

Eastern Kazakhstan

N. L. Chlenova, in her paper *O svyazh plemen Yuzhnoy Sibiri i Sredney Azii v Skifskoyu Epokhu* (Connections of the south Siberian tribes with those of middle Asia in the Scythian period, *Rapports* VII, 1966, 191–200) emphasises that in the 7th and 6th centuries BC close connections were maintained between the Siberian peoples of the Tagarskaya culture and those of east Kazakhstan; later, in the 6th–5th centuries BC, a migration took place of the east Kazakhstan and Altai tribes into the Minusinsk valley. Of a similar opinion is F. Kh. Arslanova (*SA* 1972–1, 253–258) according to whom the western side of the Altai Mountains acted as a kind of link between the Altai area and the Minusinsk valley in south Siberia, and the countries extending further west, Semirechie in east Kazakhstan and Soviet Central Asia further to the south. Furthermore, she points to the find from Kamyshinka, district of Shemonaikha, situated close to the border of the Altai country; it consisted of 18 pieces of horse bridles of bronze, cheek-pieces, bits, buckles, etc., of the 7th to 6th centuries BC, the counterparts of which can be found among Scytho-Sarmatian remains in Kazakhstan, Central Asia, Siberia and south-east Europe. On the other hand, a slab-cist grave found in the same region at Chisty Yar yielded plaques of the Chinese Ordos type, of the 7th–6th centuries BC, parts of horse harness and a few bronze arrowheads. E. E. Kuzmina (*MIA* 130, 1965, 106–110) discusses hoards of the Late Bronze Age (12th to 8th centuries BC) found in Semirechie, and points out that parallels to their articles can be found in south-eastern Europe and in central Asia. According to her, the hoards belong to the time immediately preceding the Sarmatian period, and their almost simultaneous mass-hiding was most probably connected with the beginning of tribal displacements in the area.

F. Kh. Arslanova, in four reports, gives account of her excavations in the same area (*AO* 1968, 403 f.; 1971, 501 f.; *SA* 1974–1, 122–126; *VGV* 1974, 46–60). Twenty-eight barrow graves were excavated at Zevakino near Shemonaikha, 60 km. north-west of Ust-Kamenogorsk. Burials were mainly of the Andronovo culture, but some were of a

later date, up to the 3rd–1st centuries BC. One barrow grave dated to the first half of the first millennium AD, was of the type 'with whiskers' and a vessel found in it was of a type resembling those usually found in such barrow graves in central Kazakhstan (AO 1973, 465). Sixty Andronovo graves of the *ograda* type, situated in the northern section of the cemetery within the territory of the neighbouring village of Trushnikovskoe were also investigated. In all, 98 individual burials were excavated. In some graves bronze articles were found, particularly knives of the Karasuk–Tagarskaya type and graves were of the 7th–6th centuries BC, of the time which corresponds with the date of the Karasuk culture in Siberia. Skeletons were crouched. The author is of the opinion that the grave-goods attest to tribal migrations from the Altai Mountains and Siberia into that part of Kazakhstan. Finally, a number of 'flat' Andronovo graves have been excavated at Predgornoe in the same area on the upper Irtysh near Glubokoe.

Andronovo *orgradas* and barrow graves of the Early Nomads have also been recorded further to the south-east, in the region south-east of Lake Zaysan (S. S. Samashev and V. K. Kulik, AO 1974, 493 f.). But the most important archaeological material has been obtained from a few richly furnished Sacian barrow graves in the Chiliktinskaya valley south of Lake Zaysan, north of the Targatay Ridge and about 30 km. from the Chinese border. The cemetery consisted of 61 mounds, 13 of which were about 100 m. in diameter, 8–10 m. high. In 1949 two mounds (nos. 5 and 7) were excavated, and later, in 1959–1962, nine mounds more.

The description of the most important of these, barrow 5, and a brief description of barrow 7, have been published by S. S. Chernikov in a paperback *Zagadka Zolotogo Kur-gana* (*The Riddle of the Golden Barrow*, Moscow 1965, 189 pages, 17 figures, 20 plates, a few plans and maps), which followed a preliminary report by the same author that appeared in *KSIAM* (No.98, 1964, 29–32). Burials in both mounds are ransacked, but the articles left or lost by the looters imply that the equipment of both greatly surpassed in wealth that of all other graves investigated in the cemetery. The burial chambers of both were built of timber logs on the ancient surface of the ground and covered with stones. In barrow 5 two persons were buried; besides a number of socketed bronze arrowheads (double-edged, rhomboid in shape), there were 524 gold ornaments in the shape of various animals, made mainly of thin gold leaf, or plaques which had to be sewn on to garments, quivers, etc. The manufacture and technological process of the gold articles have been discussed by S. A. Semenov, as quoted in the earlier part of the present report. The decorative style of the golden articles has been considered 'Scythian' by the author, who regards them accordingly as contemporary with the north-west Caucasian (Kelermes) and west Asiatic (Ziwiye) finds; he puts the date of barrow 5 of the Chiliktinskaya valley wrongly at the turn of the 7th and 6th centuries; its radiocarbon determination is 340 ± 90 bc. Articles of its equipment are related to those from the Pazyryk barrow graves, and their animal style is evidently derivative from west Asiatic art, which implies that they could not have been of the date proposed by the author.

Still further south, in the area around Lake Alakul, several graves were excavated by G. A. Kushaev (NAK 1968, 135–145). At site Alakul I burials of the Early Nomads were

investigated; Sacian burials of the 6th–5th centuries BC were found in barrow graves of the Arasan I and Dzharbulak cemeteries.

In 1967–1968 a survey was undertaken by M. K. Kadyrbaev (*PRK* 1972, 107–122) of the large arid steppe area extending north of Lake Balkhash up to the Chingiz-Tau Ridge, west of the steppe river Ayaguz to about the border mountains and valleys that lay between central Kazakhstan (Karaganda oblast) and east Kazakhstan (the southern part of the Semipalatinsk oblast). There, in the Katenemel Mountains, c. 210 km. north-east of Balkhash and over 400 km. west of Lake Alakul dealt with above, two Andronovo cemeteries have been discovered. In one of these, called Katenemel I, a few *ograda* graves were excavated and described by M. K. Kadyrbaev, who emphasises that the cemetery is the most south-eastern relic of the central Kazakhstan Bronze Age culture known so far. Of special interest were its double slab-cists found in the *ograda* enclosures, a feature met, so far, only in the Andronovo cemeteries of central Kazakhstan. In the area of the cemetery above four groups of barrow graves have also been recorded, and in three of these a few mounds were excavated, but no details have been given.

Of importance for the study of the prehistoric past of east Kazakhstan is the work *Drevnyaya kultura Sakov i Usuney doliny reki Ili* (*Ancient culture of the Sacians and Usuni in the valley of the river Ili*, Alma-Ata 1963, 300 pages, 11 plates) by K. A. Akishev and G. A. Kushaev. This work consists in fact of two separate contributions by the co-authors, who deal with a series of barrow grave cemeteries in the valley of the middle course of the Ili, diffused within a strip of land about 3 to 8 km. wide, extending along the right, northern, bank of the river over a distance of about 100–125 km. east of the town of Ili. The contribution by K. A. Akishev is devoted to the burials of the Sacian period, the 6th–4th centuries BC; the other one by G. A. Kushaev deals with the burials considered to be of the Usuni, of the time from the 3rd century BC to the 3rd century AD. About 450 mounds were recorded, over 220 of which were excavated. Four cemeteries were of the Sacian period (Kadyrbay, Karashoky or Kara-Choko, and Kzylauz I and, the most important of them, Besshatyr I). The Besshatyr I cemetery, situated in the centre of the Ili valley cemeteries, was a royal burial ground. It consisted of 31 mounds, the largest ones 45 to 105 m. in diameter, 6 to 17 m. high, and the smallest ones 6 to 18 m. in diameter, 1 to 2 m. high. 18 mounds were excavated, among them three large barrows. The latter had large elaborate burial chambers built of timber logs, but were for the most part looted. In spite of that, articles left by the looters imply considerable social differences between the people buried in the cemetery.

The mounds of the Usuni period formed three chronological groups, with some exceptions, each with its own cemetery. The earliest burials, of the 3rd to 2nd centuries BC, appear in three cemeteries; those of the subsequent group, of the 1st century BC and the 1st century AD, were found in five cemeteries, and mounds of the third group, of the 2nd and 3rd centuries AD, formed seven cemeteries. The equipment of all graves, general conditions in the country during the relevant periods, and the economy of the population, etc. were discussed by both authors. Anthropological study of the cranial material revealed that about 10% of the Usuni had a Mongolian admixture.

LATE BRONZE AGE AND EARLIEST IRON AGE IN KAZAKHSTAN

A large, 60 m. in diameter, 6 m. high princely barrow grave near the town of Issyk, 50 km. east of Alma-Ata, was investigated by K. A. Akishev (*AO* 1970, 408; *VGV* 1974, 61–77). The barrow formed part of a large cemetery, many mounds of which were 30 to 90 m. in diameter, 4 to 15 m. high; all were robbed. The main, the 'Issyk', barrow grave was of the 5th century BC and contained two burials, the central one entirely robbed, but the other one, of a warrior, was unscathed. Among the articles of its rich endowment were 31 clay, wooden, silver and bronze vessels and out of about 4,000 gold ornaments of various types and size found there, of interest were gold decorative plaques of a belt, adorned in a kind of Scythian animal style which may be called 'baroque'. A silver vessel bore an inscription of 26 signs, and one gold ring was in fact a seal. A sword and a dagger also belonged to the equipment of the buried warrior.

Several barrow graves were excavated at Dzhuvantobe, district of Chilik, about 100 km. east of Issyk, seven of them of the Sacian period. According to A. G. Maksimova (*KSIIMK* 80, 1960, 60 ff.) they were of the 7th to 6th centuries BC. No iron articles were found in these graves, and their pottery differed from the local ware of the preceding period. Of a later period, the 3rd century BC to the 4th to 5th century AD, were the settlements of the ancient Usuni discovered in the valley of the Kegan, close to the border with both Kirgizia and China. Their remains were excavated at Ak-Tash II and in a few other sites, as reported by K. A. Akishev (*IANK* 1969–1, 29–47) and A. K. Abetekov (*KSIAM* 122, 1970, 67–70). The latter author concludes that the economy of the Usuni in Semirechie during the final centuries BC and early centuries AD rested on pasturage, but that agriculture also played an important role.

The relationship between the Huns and the Usuni, and migrations of ancient nomads in the Semirechie country around 200 BC, have been discussed by Iu. Zuev in the work *Novye materialy do drevney i srednevekovoy istorii Kazakhstana* (New materials in the ancient and mediaeval history of Kazakhstan, *TIIAEK* 8, 1960, 5–25). The typology of ancient burials from about the 3rd century BC to the 3rd–4th centuries AD situated on the Ili and the surrounding region, has been considered by A. I. Ageeva (*TIIAEK* 12, 1961, 21–40); the results of the excavation of 52 barrow graves in five cemeteries which jointly contained 833 mounds, have been summarised. Several types of burials have been distinguished.

K. Kuzmina (*KSIAM* 122, 1970, 44–48) quotes several Late Bronze Age remains of the Andronovo culture in Semirechie and in the area around Alma-Ata. She points to their distinctive features and concludes that they have to be regarded as a local group of the culture. Its formation was due to the influx of new ethnic elements, probably from central Kazakhstan. Some Andronovo features relating in particular to the funeral rites and pottery have evidently been taken over by the local Sacian group of the subsequent period from its Andronovo predecessors.

The contribution by O. Ismagulov, *Antropologicheskaya kharakteristika Usuney Semirechia* (Anthropological character of the Usuni of Semirechie, *TIIAEK* 16, 1962, 168–191) also deserves mention. Measurements of 39 skulls of the Usuni are shown in a graph. Their analysis implies that 40% of the male skulls show Andronovo features, and

31% European features (12% of these north European). Two skulls were Mongoloid. 57% of female skulls were of the Central Asiatic type proper to the area between the rivers Amu-Daria and Syr-Daria, 12% were of the Andronovo type and 7% exhibit mixed characteristics; none showed any Mongoloid features. The author also remarks that the Central Asiatic racial type was one of the components of the Siberian type.

Southern Kazakhstan

The cemetery of the early Alakulskii type of the Andronovo culture of the Late Bronze Age at Tau-Tary on the Karatau Ridge, 7 km. south-east of Baba-Ata, was excavated first by A. G. Maksimova (*TIIAEK* 14, 1962, 37–56) and then by P. Griaznov (*KSIAM* 122, 1970, 37–43). It consisted of 22 graves. The origin of the local group to which the cemetery belonged has been discussed by the latter author. A. G. Maksimova, in a few other articles reports on the results of her further excavations in the same area. One of these (*KDSZK* 1969, 136–138) deals with Sacian burials in shafts with a recess, found in barrows of the 7th–6th centuries BC at Karamuran I on the river Shiderty, in the eastern part of northern Kazakhstan. Next was the cemetery at Kyzyl-Kaynar on the northern slope of the Kirgiz Alatau Mountains (*PRK* 1972, 123–138), consisting of 23 barrow graves and small stone cairns. Three barrow graves and 12 cairns were excavated and were of the second part of the Usuni period (1st–3rd centuries AD, except one mound and one cairn which were of the Turcic period, the 7th–9th centuries BC). In her third report A. G. Maksimova (*AIK* 1973, 156–165) gives an account of excavation of four barrow graves of heaped-up stones at Uyuk on the north-eastern slope of the Karatau Ridge, which formed part of a group of 14 mounds. The burials were of the early centuries AD. Hitherto such burial constructions and pottery found in them have been known only from the finds in Fergana. In an earlier report (*TIIAEK* 14, 1962, 97–116) A. D. Maksimova discussed such barrow graves of the period from the 3rd century BC to the 3rd century AD, usually provided with a stone ring around their perimeter; they formed part of six cemeteries situated on the northern slopes of the Karatau Ridge. Statistical data relating to these burials have been given and there are also 16 full page illustrations.

M. S. Mershchiev (*SDKK* 1970, 79–92) describes a settlement of the 1st–4th centuries AD at Kzyl-Kaynar-Tobe, at Korolevka near Dzhabul on the northern slope of the Kirgiz Ridge. In the ruins of a house the grave of a richly endowed warrior was found buried in about the 4th–5th century AD, evidently after the house, or even the settlement, had been abandoned by its inhabitants.

N. P. Podushkin (*VGV* 1974, 78–84) deliberates on the economy of the settled population of the valley of the upper Arys, the right tributary of the Syr-Daria, and in particular on that of the inhabitants of the settlements at Karaul-Tobe and Dzharti-Tobe of the 1st–4th centuries AD, situated on the slopes of the Aksu-Dzhabagdiskii Ridge, close to the border of the northern tip of the very narrow north-eastern extension of the territory of Uzbekistan. The Usuni who lived there were mainly nomad stock-breeders, but they also were hunters and gatherers and, to some extent, agriculturalists. 34 querns, pestles, stone weights and similar tools, and also some local petroglyphs attest to their

agricultural activities. In an earlier article the same author (*SDKK* 1970, 93–107) discusses the pottery of the early agriculturalists of the valley of the upper Arys of the 1st to 4th centuries AD, found in two settlements mentioned above in the article of 1974. The typology and technique of their manufacture, local particularities, etc. of the vessels have been pointed out and the material divided into two chronological groups, the earlier one of the 1st and 2nd centuries AD, the later one of the time from the 2nd to 4th centuries AD. Connections with the neighbouring peoples have been maintained.

The settlement at Aktobe on the southern side of the middle course of the Syr-Daria, 7 km. north-west from Boba-Ata, has been investigated by T. B. Senigova (*TIIAEK* 14, 1962, 57–82). It was in existence during the period from the 3rd century BC to the 3rd century AD, and was one of the earliest settlements in southern Kazakhstan. Its plan was very similar to that of its coeval settlements in Chorasmia. The cemetery that belonged to it was investigated by M. S. Mershchiev (*TIIAEK* 14, 1962, 83–87); it consisted of about 100 mounds raised of earth and stones, and extended over a distance of about 4 km. Two mounds were excavated, both of the 1st century AD, their pottery and other articles being of the same type and category as those found in the settlement.

In a special book *Drevnosti Chardary (Antiquities of Chardara)*, Alma-Ata 1968, 264 pages) by A. G. Maksimova with three associates, account is given on investigation in the area which is to be submerged by the waters of a reservoir under construction. It embraced a part of the right bank of the middle course of the Syr-Daria, about 100 km. west of Tashkent, and extended over a part of the Kelesskie steppes. A settlement of the 1st to 4th centuries AD at Aktobe 2, and the earthwork Aktobe 1 of the Kaumzi culture of the 4th to 13th centuries AD were investigated.

The last region of southern Kazakhstan to be dealt with is the ancient delta of the Syr-Daria. During the period under review, the country was inhabited by Sacian tribes, the Massagetae of Herodotus, who were under the strong spell of the Chorasmian civilisation that flourished then about 300 km. further south, in the delta of the Amu-Daria. Several publications are devoted to this region, some of which were quoted in my previous reports (*Bulletins* 7, 80; 8–9, 143 f.).

S. P. Tolstov (*SE* 1961–4, 114–146) outlined the racial, cultural and political conditions in the area within and around the delta of the Syr-Daria during the period from about 500 BC to about 500 AD, based on archaeological evidence and on ancient historical records. He gave special attention to the formation of units of the heavy cavalry, the *cataphracti*, and to their battle tactics; and also to the tomb, the ‘mausoleum’ at Chirik-Rabat, in which — in the 4th century AD — what is taken to be a chief of a *cataphracti* unit was buried fully armed.

Two large Sacian cemeteries in the delta, at Tagisken and Uygarak that lay about 30 km. apart were excavated and their burial rites and manifold grave-goods discussed, the latter being published in a series of articles and books. Some of these have already been quoted by me in reports mentioned above; among the new publications, or those missed previously, are an article by S. P. Tolstov and M. A. Itina (*SA* 1968–2, 151–175), and another one by O. A. Vishnevskaya and M. A. Itina (*MIA* 177, 1971, 197–208), and in

addition the book *Kultura Saksikh plemen nizoviev Syrdarii v VII-V vv. do n.e. (The Culture of the Sacian Tribes of the Lower Reaches of the Syrdaria in the 7th–5th centuries BC*, Moscow 1973, 162 pages including 29 plates, *TKhAEE VIII*) by A. O. Vishnevskaya, reviewed by E. E. Kuzmina (*SA* 1975–2, 287–292). The book deals with the material from the Uygarak cemetery.

Almost all authors above emphasise that anthropological study of the cranial material revealed that the Sacians of the area were basically of the Europoidal racial type, of Andronovo ancestry, with no admixture of Mongolian elements. Surprising is the strong Mongolian element in the female cranial types from Tagisken and Uygarak. The Mongolian element must have penetrated there from the Altai region and from the centre of Asia further to the east. According to the authors above, the Syr-Darian Sacians both racially and culturally differ from the Sacians of the countries extending further to the east; this was due mainly to a slight admixture of the native population of the area whose culture differed from that of the Sacian newcomers. But the strongest links of the Syr-Darian Sacians connected them with their kindred Sacian tribes of the regions that lay further to the north-east in Kazakhstan, presumably their original country. Connections were also maintained with the agricultural countries of western Asia.

According to S. P. Tolstov (*VDI* 1963–2, 42 ff.), in the second half of the first millennium BC began the southern movement of the Syr-Darian Sacians, who were one of the Iranian groups that conquered Bactria and entered India. However, most of the Sacians did not migrate, but in remaining in their own country succumbed to the Hunnic influence first, and later on some Turcic tribes entered the country and mingled with the remaining Sacians.

A few articles are devoted to the Syr-Darian pottery. Thus Kh. Duke (*IMKU* 8, 1969, 63–68) points to similarity between the Tagisken pottery and that of the Karasuk culture. L. M. Levina (in *Materialnaya Kultura Narodov Sredney Aziii i Kazakhstana*, Moscow 1966, 45–90) publishes the plans of the earthwork of Dzhetysay No.3, situated on the Kuvan-Daria, a branch of the Syr-Darian delta. She deliberates on pottery from the three layers of the earthwork, which jointly covered the period from the mid-first millennium BC to the 4th century AD. And again L. M. Levina in her special book *Keramika Nizhney i Sredney Syrdarii v I-tysiacheleti n.e. (Pottery of the Lower and Middle Syr-Daria in the first millennium AD*, Moscow 1971, 262 pages, 66 figures, *TKhAEE VII*) publishes the results of her study of pottery of the first millennium AD from all sites of the delta of the Syr-Daria. Finally, M. A. Itina with two associates (*AO* 1972, 449 ff.) reports on her excavation of site Tas I on the Inkardaria, a branch of the Syr-Darian delta, which yielded pottery of the Zamaraevskii and Tagisken types. A settlement near Balandy at Sengil-Kala, of the 4th to 2nd centuries BC, was also investigated and the pottery was found to be of Chirik-Rabat type.

Some operating parameters for Roman ironworks

by HENRY CLEERE

INTRODUCTION

During the past 25 years a great deal of information has been gained about the technology of early ironmaking. Excavations have provided data on furnace construction and disposition, and operating parameters relating to burden composition, blowing rates, slag formation, product control, etc. have been derived from both the study of remains from antiquity and the operation of reconstructed furnaces. Moreover, typological surveys of technological developments (furnace types, fabrication methods, etc.) have produced cultural data that are of significance in the overall study of human development.

However, there have been very few studies during this period that have attempted to use the growing corpus of information to evaluate the social and economic significance of the iron industry in a given culture. This is in part attributable to the fact that the great majority of excavations have been confined to industrial remains — furnaces, slag heaps, workshops. Only a handful of these excavations have extended to the dwellings of the ironworkers, which alone can provide details of the cultural and social backgrounds to the settlements. Few have attempted to relate the scale of operations on a given site to the overall effect of the industry on both the ancient landscape and the economic structure of the society in which it was operating. The work of Bielenin, recently summarised in a masterly monograph (Bielenin, 1974), can be excepted from this criticism, in that it has attempted to study the early iron industry of the Holy Cross Mountains as a totality. An interesting early approach towards a quantitative study of early ironmaking was made by Gilles (1961) in his report on the Ahrweiler settlement.

The present paper is intended to identify some neglected areas of potential research, based on the author's work on the Roman industry of the Weald of south-eastern Britain, and more specifically to that sector of the industry operated on a relatively large scale by the *Classis Britannica* (Cleere, 1974). The figures given are therefore specific to a region and to a military site and industry. They may well not be directly applicable to other regions and socio-economic frameworks and to different technologies, but it is hoped that the approach and methodology adopted may be such as to be applicable with profit to other regions and industries.

The following main subjects are dealt with in the paper:

1. Regional production figures, calculated from remaining slag heaps and slag-metalled roads, related to the production of individual sites and furnaces.
2. Consumption of raw materials (ore, timber), related to sources of supply, and the effect on the landscape (mining, deforestation).
3. Manning requirements, used to produce demographic data.

PRODUCTION AND PRODUCTIVITY

Individual sites

The basic field data for this study in the Weald are provided by the slag heaps that in some cases still survive in what appears to be their original dimensions, plus the long stretches of Roman road that have been shown by excavation to have been metalled with iron slag.

The Bardown site (Cleere, 1970a) provides a useful starting point for this study, since it has been intensively studied by the present author by excavation and field survey for 15 years. The only surface feature is a large slag and rubbish dump extending along the south bank of a small stream. This dump is about 100 m. in length, up to 50 m. wide at its greatest dimension, and has been shown by excavation to be up to 3 m. deep. This is equivalent, assuming an average deposit depth of 1 m., to approximately 4,000 m³ of waste material. Of this, one-half may be assumed to be represented by smelting slag, the remainder being composed of charcoal and ore fines, furnace structural debris, and domestic rubbish (including a large amount of pottery). The tap slag on the bank has been assumed for the purposes of this study to be 2,000 m³.

Assuming an average specific gravity of 3.0 for this early bloomery slag (Straker, 1931) the total weight of slag on the Bardown bank may be calculated to be 6,000 tonnes. Gilles (1961:1072) takes a lower specific gravity of 2.5 for the Ahrweiler slag; however, he applies this to the total volume of slag heap No.1 there, which may represent an adjustment to account for voids, soil, pottery, etc. To this should be added the slag used for the metalling of the roads running across and out of the site, providing access from one part to another, linking the main settlement with ore pits and 'satellite sites' (see below), and joining up with the main known Roman road in the area. These roads, which are assumed to be an average 3.0 m. wide, are considered in this connection to cover 10 km. (five 1 km. link roads to ore pits and one major 5 km. access road). Assuming an average depth of metalling of 50 mm., the total volume of slag used for road metalling which may be directly attributed to ironmaking activities at the main settlement is 1,500 m³, equivalent to 4,500 tonnes. Thus the total production of slag from the site during its working period was approximately 10,500 tonnes.

Excavation has shown that the settlement was founded between AD 120 and AD 140, and that it closed down between AD 220 and AD 240. However, it is also clear that industrial operations ceased at the main settlement around AD 200; thus, the 10,500

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tonnes of slag may be assumed to have been produced in a period of at most 80 years, i.e. c. 125 t/year.

After AD 200, ironmaking continued at a number of 'satellite' workplaces, located 1.5–2.5 km. from the main settlement and linked with it by slag-metalled tracks; five of these sites have been fairly securely identified and one, at Holbeanwood, has been almost totally excavated (Cleere, 1970a). These satellite workplaces show no evidence of occupation; it is clear from excavations at the main Bardown settlement that occupation continued here after industrial operations had ceased, and so it is likely that the satellites were only workplaces, the workers continuing to live at the main settlement. The general layout of the complex of main settlement and satellites is shown in Fig.1.

The Holbeanwood site produced about 50 m³ of slag, representing 150 tonnes. To this should be added 150 m³ (450 tonnes) for a 1 km. stretch of link road. Twelve shaft furnaces of the author's Type B.1.i (Cleere, 1972) were excavated, in two groups of six, and a third group can be fairly confidently extrapolated. Examination of the slag dumps suggested that the site had been operated for no more than ten years (Cleere, 1971a). If this site is typical of the other four known satellites, one may postulate a total production of 3,000 tonnes of slag over a period of 40–50 years.

The total production of slag for the whole complex was thus about 13,500 tonnes, produced over a period of 80–120 years. Using the slag/metal ratio proposed by Gilles (1961:1072) and Bielenin (1974:265) of 3:1, which would appear to be broadly applicable to the slightly different type of process represented by the Holbeanwood furnaces, this represents an iron production of 4,500 tonnes: 3,500 tonnes from the main settlement and 200 tonnes from each of the satellites. Thus the annual rate of iron production at the main Bardown settlement may be estimated to have been 40–45 tonnes and that of the satellites as c. 20 tonnes (assuming a ten-year life for each).

As stated above, there were probably 18 furnaces at the Holbeanwood site, apparently in three groups of six, and there are indications from the layouts of the two groups excavated that at most three furnaces would have been operating simultaneously.

The author's theory of cyclical operation of bloomeries (Cleere, 1971a) is based on observations of the refuse deposits at Holbeanwood and reports of the type of buildup at other sites, such as Beauport Park (Plate I is a mid-19th century view of the heap being sectioned during the course of quarrying for road metalling), Chitcombe, Footlands, and elsewhere. The successive dumping of layers of charcoal fines, roasted ore fines, tap slag, and furnace debris are believed to represent successive operational phases, each probably seasonal. Thus a period of wood cutting and charcoal burning would have been followed by a period devoted to ore mining, roasting, and grading, the resultant furnace materials being stored for use in the third phase, that of smelting. Finally, when the accumulated stocks had been consumed, the furnaces would have been repaired and, where necessary, rebuilt before the whole cycle began again.

The cycle is taken to be one year, which seems justifiable, having regard to climatic and vegetational factors. The charcoal and ore phases would probably have been relatively short (but see below): timber was abundant in the area and the ore was relatively easy to

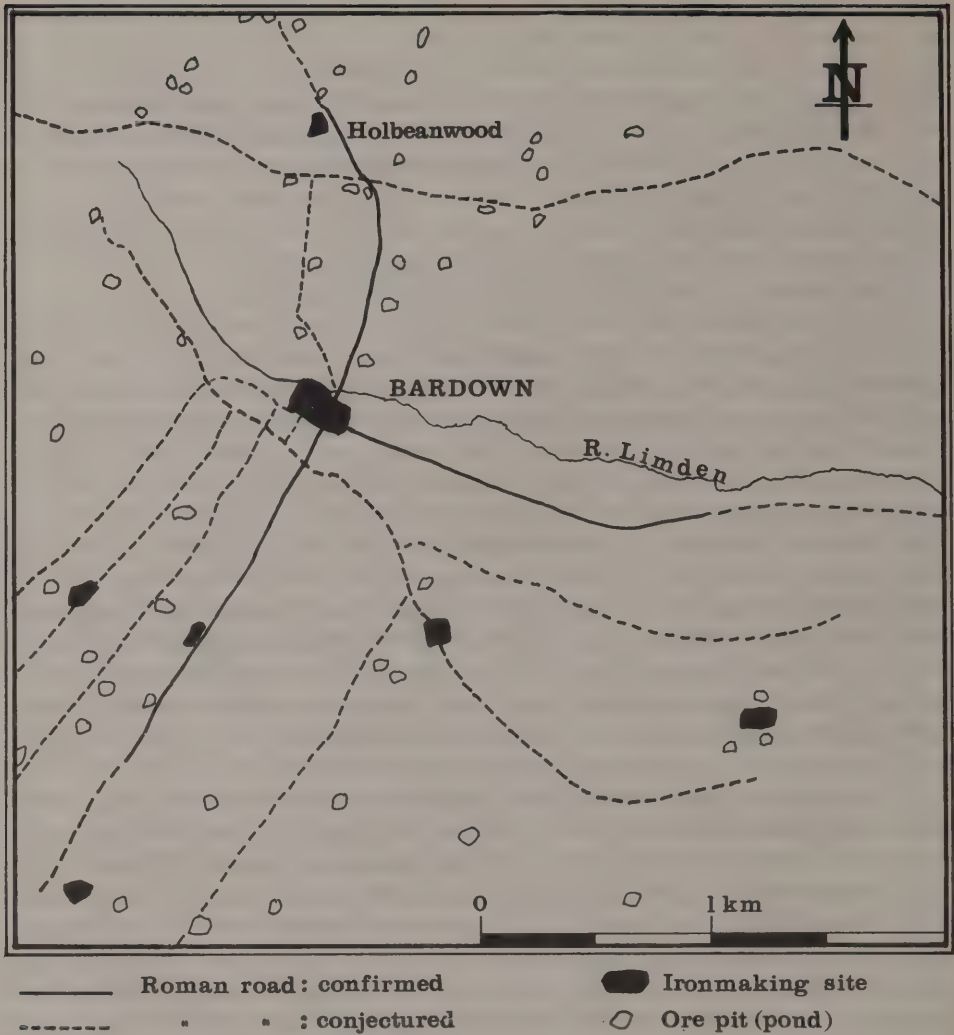


Fig.1 The Bardown ironmaking settlement, showing possible satellite sites, ore pits, and roads.

extract once it had been located. Smelting, on the other hand, would have been a lengthy process: the author's own experiments on a reconstruction of the Holbeanwood type of furnace (Cleere, 1970b; 1971b) produced only 10 kg. of iron from its most successful smelt, but the Roman ironmaker may safely be assumed to have been more expert and capable of producing blooms of perhaps 30 kg. in one day. Gilles (1961:1072) assumed a daily output of only 15 kg. from similar furnaces in his calculations, possibly as a result of some rather disappointing smelting experiments (Gilles, 1960). Thus, with three fur-



Plate I 19th century engraving of the slag dump at Beauport Park, during excavation for road metal-ling, showing stratification (Straker 1931, 331).

naces operating, the daily iron production of the Holbeanwood satellite workplace could have been in the region of 90–100 kg.

The total output of 20 tonnes would thus have required some seven months to produce, leaving five months for the charcoal and ore phases (neglecting the repair phase, which would not have taken more than a few days and might well have been concurrent with timber felling and charcoal burning). The length of time needed for mining the equivalent amount of ore is discussed in a later section.

If these figures are applied to the main Bardown site, where an industrial phase of c. 80 years has been deduced from dating evidence, it is possible to calculate from an annual iron output of 40–45 tonnes that seven or eight furnaces must have been in operation simultaneously during the smelting phase in any year. The furnaces have not yet been located on this site; however, since it covers nearly 3 ha and only a very small area has been sampled, there is no reason to assume that these calculations are grossly inaccurate.

The region

The present author has recently published a survey of the Roman iron industry in the Weald and its connections with the *Classis Britannica* (Cleere, 1974). In this study, a group of six sites in the eastern part of the region have been identified, by virtue of finds

of stamped tiles, geographical location as related to road and sea communications, and apparent scale of operations, as forming a homogeneous group, operated under Imperial control by the Fleet. Assessment of the period of operation of these sites and their size is difficult, since none has been properly excavated and, moreover, since several of the slag dumps were quarried away for road metalling in the 19th century (see Fig.2). The figures given in Table 1 for size of slag dump, weight of slag produced, and iron output, together with the dates given, must be considered to be no more than approximations (with the exception of Bardown). The location of the sites is shown in Fig.2.

It will be seen that the estimated annual output of these six sites alone for the period AD 120–240 was *c.* 550 tonnes. Using the calculations in the preceding section, it emerges that 80–90 furnaces would have been in operation on these sites during the smelting phase of the production cycle in any year during that period. It should be remembered, however, that these are only the major known sites; at least ten smaller sites are known in this part of the region and previously unknown ones come to light frequently. Moreover, there are many kilometres of known Roman roads metalled with iron slag in the region, much in one area where there are no bloomeries so far discovered, and these would increase the slag weight figures substantially. It would be no exaggeration to suggest that the number of furnaces in operation was well over 100, with an annual output approaching 1,000 tonnes.

RAW MATERIALS CONSUMPTION

Charcoal and timber

Bielenin (1974, 266) suggests a 1:1 weight ratio for charcoal consumption in relation to iron ore in smelting, and this has been confirmed by other workers who have carried out experimental work on reconstructed bloomery furnaces (e.g. Cleere, 1970b; 1971b; Tylecote et al., 1971). However, smelting is only one of the processes involved in iron production: ore roasting, forging, and the preheating of smelting furnaces all consume significant quantities of fuel. Moreover, finds of charcoal fines on refuse heaps reveal that the yield of usable charcoal from green wood was less than 100%. It is reasonable therefore to assume that for the whole process sequence the charcoal/ore ratio was 2:1.

The yield of metallic iron from iron ore in the bloomery process was, of course, rather variable, depending on the type of ore and on operating variables that were a function of the skill of the smelter. Bielenin (1974:265) suggests an ore/slag/iron weight ratio

TABLE 1. *Estimated Slag and Iron Production from Major Wealden Sites*

Site	Dating	Slag volume, <i>m</i> ³	Slag weight, tonnes	Iron production, tonnes	
				Total	Annual
Bardown	120–240	4,500	13,500	4,500	40
Beauport Park	100–240	30,000	100,000	30,000	210
Chitcombe	100–240	10,000	30,000	10,000	70
Crowhurst Park	50–240	10,000	30,000	10,000	50
Footlands	50–400	15,000	45,000	15,000	40
Oaklands Park	100–240	20,000	60,000	20,000	140

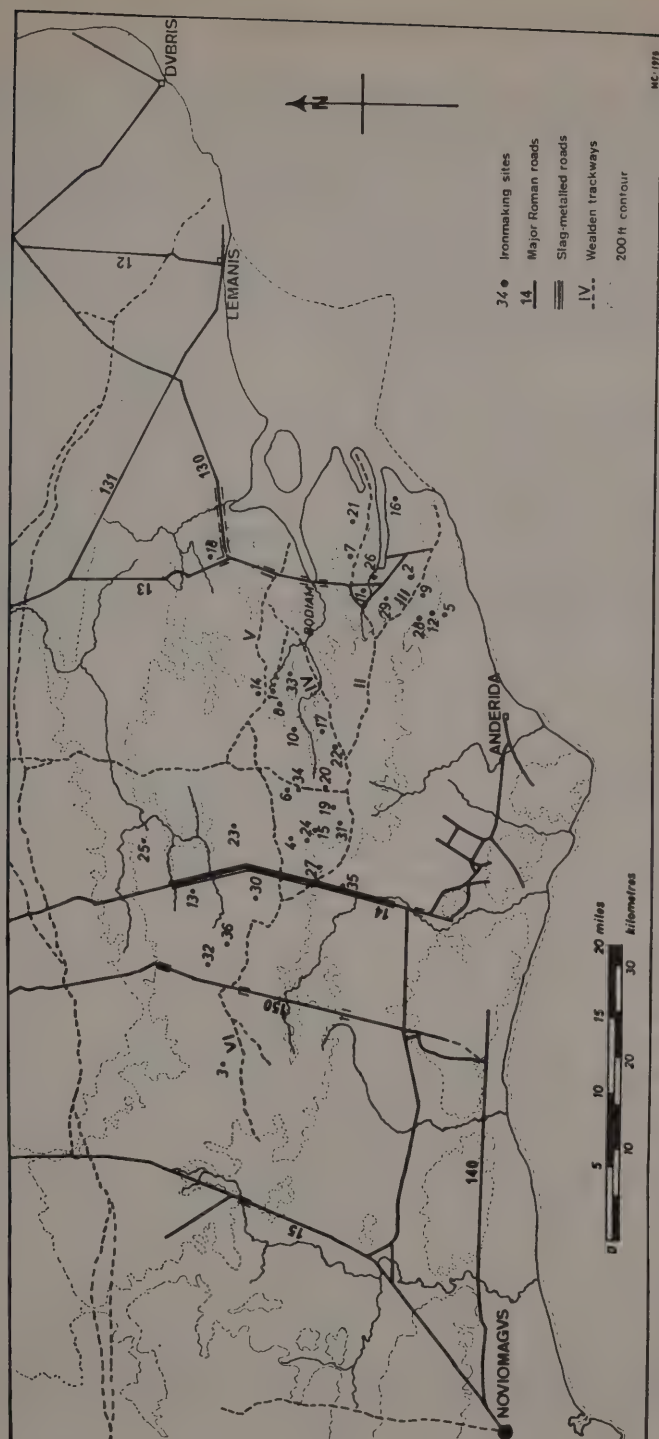


Fig. 2 Roman ironmaking sites in the Weald (Cleere 1974; Fig. 1). The six sites considered in the paper are Bardown (1), Beauport Park (2), Chitcombe (7), Crowhurst Park (9), Footlands (11), and Oaklands Park (26). The Holbeanwood satellite of Bardown is 14. (*Arch. J.* 131, 1974, 179, by kind permission of the Editor.)

for the Rudki hematite smelted in the Holy Cross Mountains type of furnace of 6:3:1 for the raw bloom and 10:5:1 for the finished bloom. The former ratio is probably more relevant to the Wealden carbonate ores and the type of smelting furnace used, where the slag separation in the primary bloom was more effective than in the Holy Cross Mountains type. On the basis of these figures, the charcoal/iron weight ratio may be considered to be 12:1.

When this ratio is applied to the Roman military industry of the Weald and to the Bardown complex, the following charcoal usage may be calculated:

	<i>Iron output, tonnes</i>		<i>Calculated charcoal usage, tonnes</i>	
	<i>Total</i>	<i>Annual</i>	<i>Total</i>	<i>Annual</i>
Weald (AD 120–240)	66,000	550	792,000	6,000
Bardown	4,500	40	54,000	480

Exact values for the yield of charcoal from hardwoods are difficult to come by. The modern retort process uses 5–6 tonnes of wood per tonne of charcoal, and it is reasonable to assume that the Roman charcoal burners using the pit or heap burning process would not have been significantly less efficient. A yield of 1:7 seems probable.

The mature forest cover of the Weald, with its heavy clay soils, was of deciduous hardwoods — mainly oak, with ash, beech, alder, and hornbeam intermingled, and such trees as hazel, hawthorn, and birch colonising gaps. Charcoal from all these species has been found at the Bardown and Holbeanwood sites, but with oak preponderating.

The rate of distribution of mature oaks in the primeval forest of the Weald is not easy to establish, since it cannot be claimed with certainty that this survives anywhere at the present time. Rackham (1974:68) refers to a 16 ha area which produced 740 trees in the 14th century (46 trees/ha), but also cites Beevor (1924) as an authority for a variation in Norfolk woodland between 12 and 100 trees/ha. His table showing the results of an early 17th century survey in Suffolk (Rackham, 1974:72) shows a variation between 29 and 50 trees/ha. Waters and Christie (1958) show for quality class I (Best) a rate of 62 trees/ha at 150 years (30 m. height), and this may be calculated to diminish to about 37 trees/ha at maturity (250–300 years). Allowing for a natural cycle of death and regeneration, it would seem acceptable to assume an average cover of 45 trees/ha in a primeval forest (to include trees of several species at various stages of growth).

A mean estimate for the volume of stem wood per hectare based on the data given by Waters and Christie (1958) is 1,200 m³/ha. However, only branch wood is likely to have been used for charcoal burning, as is evidenced by the material from excavations and from recent charcoal-burning practice. The same authorities give a rough estimate of 50% of the stem volume (600 m³/ha) for branches; however, the thicker branches of mature oaks could not have been utilised for charcoal burning, and it is probably closer to reality to reduce this figure by one-third, giving an average volume of wood suitable for burning of 400 m³/ha.

The specific gravity of oak is 0.6, which gives a weight of *c.* 250 tonnes/ha. With a yield of 1 tonne of charcoal from 7 tonnes of wood, this means that 1 hectare would pro-

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duce c. 35 tonnes of charcoal. At a charcoal/iron ratio of 12:1 this means that each hectare would produce only enough charcoal for the smelting of 3 tonnes of iron.

Applying these figures to the Bardown main settlement output of 40–45 tonnes/year suggests that 13–15 ha of woodland would need to be cleared or lopped annually, and that about 1,200 ha (12 km²) would have been cleared during the period of industrial operations on the main site. Thus, by the time the satellite workplaces were set up, the distance from the centre of the main settlement to the nearest supplies of timber for charcoal was approximately 2 km., i.e. roughly the average distance of the satellites from the main site.

The satellite workplaces themselves, each with an estimated total output of 200 tonnes, would have been responsible for the clearance of some 70 ha of woodland each, or 3.5 km² for the five that have been identified. The total impact of the Bardown operation on the landscape of this area was the clearance of 15.5 km² of forest in a period of about a century.

On a regional level, Table 2 shows the forest clearance resulting from the operations of the six major presumed military sites listed in Table 1. The annual production of 550 tonnes of iron during the period AD 120–240 would have resulted in the clearance of nearly 2 km² of forest per year (or nearer 3.5 km² if the larger figure of 1,000 tonnes/year is taken).

TABLE 2. *Estimated Forest Clearance for Ironmaking at Major Wealden Sites*

Site	Iron production, tonnes		Equivalent forest clearance, km ²	
	Total	Annual	Total	Annual
Bardown	4,500	40	15.0	0.13
Beauport Park	30,000	210	100.0	0.70
Chitcombe	10,000	70	30.0	0.23
Crowhurst Park	10,000	50	30.0	0.17
Footlands	15,000	40	50.0	0.13
Oaklands Park	20,000	140	70.0	0.47

By the time ironmaking in the eastern Weald ceased in the mid-3rd century (with the possible exception of the Footlands settlement), nearly 300 km² of forest had been cleared (or 500 km² using the larger annual figure), and the area around Battle, where all but Bardown of the six sites listed in Tables 1 and 2 are located, must have been devastated. Indeed, the deforestation in this area may well have contributed in some measure to the Fleet's abandonment of the eastern Weald as its ironmaking base in the mid-3rd century.

Iron ore

It is somewhat more difficult to assess the effect of ore mining on the landscape in relation to the operations of individual works and a regional industry, since the exact mode of occurrence of the carbonate ores of the Weald is not fully known at the local level.

The Wealden District volume of the British Regional Geology (Gallois, 1956:26) refers to the ores in the following terms:

'Much of the iron ore which formed the basis of the Wealden Iron industry in east Sussex and Kent . . . was obtained from the Wadhurst Clay in which it occurs both as nodules and in tabular masses. This clay ironstone is sideritic . . . and weathers to limonite . . . The most important and consistent ironstone horizon occurs near the base of the formation.'

Observation of an exposure in a brick pit near Sharpthorne by the author showed that the nodular ore appeared to occur in lenses about 0.30 m. thick and varying in size from 5 to 15 m. across. There were three lenses of nodules visible within the main stratum, which consisted of tabular ore, in this exposure, which was about 150 m. long. Unfortunately, this is the only such extensive exposure known to the Institute of Geological Sciences, and there is no evidence as to whether it is representative or not. Ore mining ceased in the Weald at the beginning of the 18th century (apart from an abortive short-lived venture in the mid-19th century), and there are no records of the mode of occurrence of the ores from the earlier period. It is necessary therefore to attempt to reconstruct this from the remaining traces of early industrial operations.

Mining was invariably opencast in the Weald (with the exception of the 19th century venture), using open pits at first and later, in the medieval and post-medieval periods, bell-pitting. Water-filled pits are a characteristic feature on the Wadhurst Clay around early ironmaking sites. At least 50 such pits or ponds can be observed in the immediate vicinity of the Bardown settlement (see Fig.1) varying in size from 10 to 30 m. across; in addition, there are two very large excavations into the Wadhurst Clay which forms the north bank of the stream that delineates one side of the main settlement, and it has been deduced that these represent the earliest ore workings, the ore body having been located by the stream cutting through the soft overlying clays.

Finds from Roman sites suggest that the nodular ore (40–45% Fe) was preferred to the tabular form (35–40% Fe). Only the 1st century AD site at Minepit Wood (Money, 1974) has produced relatively abundant evidence of the use of the lower-grade tabular ore. The distribution of ore pits around Bardown seems to confirm the evidence from excavation. On the basis of the observations made at Sharpthorne it might be assumed that the lenses of nodular ore occur at a density of about two per hectare (200 per km²), but field study in the Bardown area has revealed only 10–20 per square kilometre. The discrepancy may be attributable to the somewhat empirical technique probably used by Roman prospectors to locate nodular ore. It has been assumed for the purposes of the present study that the density was 12 pits per square kilometre and that the average pit was 15 m. diameter, but it is acknowledged that these figures may be inaccurate by a factor of at least 10.

Assuming a constant depth of deposit of 0.30 m., the volume of ore extracted from each pit was therefore:

$$\pi \cdot \left(\frac{15}{2}\right)^2 \cdot 0.30 = 53 \text{ m}^3$$

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The specific gravity of siderite is given by Read (1973:521–2) as 3.7–3.9. However, the characteristic nodule from the Wadhurst Clay consists of siderite enclosed in a skin of up to 0.01 m. thick of limonite, altered by weathering from siderite (giving rise to the local name of ‘box-stone’). The same authority (Read 1973:520) gives a specific gravity of 3.6–4 for limonite.

The friable limonitic material filling the interstices between individual nodules was probably lost in the extraction process. In addition the loss on ignition during the roasting was probably of the order of 25% (Cleere, 1970b:5) or even higher (Tylecote, personal communication). It would therefore be advisable to assume a net specific gravity factor of 2.6 to derive the weight of ore available for smelting, giving 136 tonnes per pit.

Bielenin (1974:265) indicates an ore/iron ratio of 6:1; this was derived from experiments using a hematite with a higher Fe content (50%) than the Wealden siderite, but also a higher SiO₂ content of 13.5% compared with 10% for the Wealden ore (Cleere, 1970b:5), which would reduce the proportion of metal available for smelting, since more would be needed in oxide form to flux the extra silica and produce a fluid slag. It seems reasonable therefore to use this as a convenient rule-of-thumb for the present investigation. Applying it to the average figure for ore yield gives an iron yield of 23 tonnes per pit.

Using the assumed ore-pit density of 12 per square kilometre gives an iron yield of 276 tonnes/km². In general terms, it looks as though two pits would have sufficed for one year’s iron production at Bardown, and 1 km² would have been exhausted in six years. The 3,500 tonnes estimated as having been produced at the main settlement would have resulted in the apparent total exploitation of ore deposits over an area of 12–13 km², a figure which is in striking agreement with that calculated for forest clearance and given in the preceding section.

Table 3 shows the calculated exploitation of iron ores in the Weald by the six major military sites listed in Table 1. The total area of land exploited for iron ore by the Roman ironmakers was thus over 300 km², corresponding to the area of deforestation. Again, one may reflect on the effect of this intensive exploitation of the natural resources on the political decision taken to close the state-controlled industry in the mid-3rd century. The degree of efficiency in prospecting and extraction of iron ores on the part of the Roman ironmakers is also borne out by the distribution of the medieval and post-medieval iron industry in the areas of Roman working: at none of the major sites listed in Tables 1–3 was there any later working.

TABLE 3. *Estimated Iron-ore Exploitation at Major Wealden Sites*

Site	Iron production tonnes		Equivalent ore exploitation, km ²	
	Total	Annual	Total	Annual
Bardown	4,500	40	17	0.15
Beauport Park	30,000	210	108	0.75
Chitcombe	10,000	70	36	0.25
Crowhurst Park	10,000	50	36	0.18
Footlands	15,000	40	54	0.15
Oaklands Park	20,000	140	72	0.50

MANNING REQUIREMENTS

The present author's experiments on a reconstruction of a furnace of the type used at Holbeanwood (Cleere, 1970b; 1971b), combined with observations of a parallel type of furnace operated by primitive Indian ironworkers (Cleere, 1963) have produced information on which it is possible to base some calculations regarding the possible manning requirements of Roman furnaces.

The smelting experiments were designed to establish the procedures and personnel for smelting iron in the early furnaces rather than the technological parameters, which have been comprehensively explored under laboratory conditions by Tylecote et al. (1971) and others. It became clear that the process could be operated without undue fatigue by a team of three at the most: two would be responsible for alternating between operating the bellows for blast and preparing the charges of ore and charcoal, whilst the third would have acted effectively as a foreman or charge-hand, making the additions of the furnace, checking slag evolution, etc. This was confirmed by the Indian ironmakers, whose team consisted of two men who carried out the blowing and charge-preparation operations under the strict supervision of an elderly lady, who was unquestionably the 'master ironmaker'.

If these observations are applied to the Bardown situation, where it has already been calculated that seven or eight furnaces were in operation simultaneously, the *minimum* manning figure for the establishment was of the order of 25 men (assuming that there would have been an officer in command of the establishment). It is perhaps unreasonable to assume that a group of men as small as this would have been capable of clearing 13–15 ha of woodland, cutting and burning it, and grading and stacking, and also of digging two pits containing 106 m³ (272 tonnes) of ore, plus overburden, which may be several metres thick in this area, and roasting and grading it, in a period of only five months. It is not improbable that ore digging at least would have overlapped with the smelting operation to some extent, and that the effective complement of the furnaces was four or even five men. The working strength of the Bardown settlement was therefore probably some 40 men. With non-craftsmen (cooks, orderlies, wagon and mule drivers, etc.), the total manning of the settlement may well have been 50–60 men, housed in the timber barrack block observed from air photographs, of which a substantial section has been excavated.

Extending these calculations to the region as a whole and using the data given in Tables 1–3, it is possible to derive a total strength for the six large sites believed to have been associated with the *Classis Britannica* of 500–700 men, perhaps the equivalent of a quingenary cohort. No doubt there were families and camp followers of various kinds, especially at the larger sites such as Beauport Park and Oaklands Park, bringing the total population up to at least a thousand. The Beauport Park establishment must have been a large one, perhaps the headquarters of the fleet detachment concerned with ironworking, since it boasted a substantial six-roomed bath-house of military type, similar to those known from auxiliary forts elsewhere in the province.

CONCLUSIONS

This paper represents a first attempt to derive information about the effect of in-

dustry on the landscape and demographic data from technological data resulting from excavations and fieldwork.

On the basis of calculations, it is suggested that deforestation for charcoal and ore exploitation were more or less in balance in the conditions obtaining on the Wadhurst Clay of the Weald in south-eastern England. The operations of six major ironmaking settlements, all believed to have been operated by the *Classis Britannica*, resulted in the clearance of nearly 300 km² of primeval forest and the exhaustion of ore deposits over an equivalent area between AD 50 and AD 240.

Smelting experiments on reconstructed furnaces of Roman type coupled with observations of modern primitive ironmakers imply that the minimum manning requirement for this level of production was 500–700 men during the 2nd and early 3rd centuries AD.

ACKNOWLEDGMENTS

The author is especially grateful to his former UN colleague, Mr Robert M. Hallett, of the Timber Research and Development Association, for his help in compiling data for the section on charcoal and timber. He also wishes to thank Dr Radomír Pleiner (Archaeological Institute, Prague) and Dr R. F. Tylecote (University of Newcastle upon Tyne) for their helpful comments on the first draft of the paper.

Abstract

The paper uses data from excavations and field survey of Roman ironmaking sites in the Weald of south-eastern Britain to assess the effect on an ancient landscape in terms of deforestation to provide charcoal as fuel for smelting and of ore mining. It is calculated that operations on six of the largest sites would have resulted in the clearance in a little over one century of 300–500 km² of forest and ore exploitation over an equivalent area.

Data from experiments in reconstructed Roman furnaces and from modern primitive ironmaking are used to assess the probable manning requirements of individual furnaces, settlements, and the entire military operation in this part of the Weald.

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Analyses of Wealden iron ores and their archaeological significance

by J. GIBSON-HILL and B. C. WORSSAM

1. INTRODUCTION

In a previous study (Worssam 1972) of Wealden iron ores of the area between Horsham and Crawley, West Sussex, samples of ironstone were examined in thin section, but because it could not be certain that they were representative of ore actually used in furnaces, chemical analyses were not undertaken.

In 1973, continuing rescue excavation of the Iron Age and Romano-British industrial settlement at Broadfields (Gibson-Hill 1974/1975) revealed a layer of roasted ore in association with a smelting furnace dated to the second century AD. Also in 1973 an excavation for a sewer trench in the St. Leonards Forest area south of Broadfields exposed an ironstone bed that in all probability was the main seam dug from minepits in its vicinity. In the same year a sample of superficial iron pan or 'bog iron ore' from an outcrop of clay ironstone north of Crawley was acquired by the authors. Both the mode of formation of the material and the extent to which it was used as an ore are debatable (Straker 1931: 104) and chemical analysis of it, no less than of samples from the Broadfields and St. Leonards Forest sites mentioned above, was therefore desirable from both archaeological and geological points of view. Samples were submitted to the Petrographical Department, Institute of Geological Sciences, for analysis by the Laboratory of the Government Chemist. The resulting analyses are given in Table 1; the sites from which the samples were obtained are shown in Figs.1 and 2. One of these analyses (Lab. No.2488) has been published in the *Annual Report* of the Institute of Geological Sciences for 1974, 132.

Complete analyses were requested because few such analyses of Wealden rocks are available, and also because from a metallurgical point of view, some constituents present in only minor proportion can exert a significant influence on the smelting process. Further, a knowledge of the complete composition of typical ores, including elements present in trace quantity, can help in identifying ore from analyses of slags.

In the present paper the results of the analyses are discussed in the context of the light that has been thrown on the Wealden iron industry by recent archaeological work, particularly by excavation of the Broadfields industrial settlement. A comparison with previously published analyses of Wealden iron ores, from more strictly geological and metallurgical points of view, is being undertaken in a separate paper (Worssam and Gibson-Hill, in preparation).

TABLE 1. *Analysis of Iron Ores from the Crawley District*

	<i>Lab. No.2488</i> <i>Fig.3 & 4(A)</i> %	<i>Lab. No.2489</i> <i>Fig.3 & 4(B)</i> %	<i>Lab. No.2490</i> <i>Fig.3 & 4(C)</i> %
SiO ₂	22.43	23.96	8.52
Al ₂ O ₃	4.64	9.56	5.54
Fe ₂ O ₃	1.52	39.73	73.80
FeO	37.10	—	—
Mg.O	1.13	0.52	1.86
Ca.O	1.38	0.30	1.80
Na ₂ O	0.11	0.11	0.04
K ₂ O	0.71	1.16	0.44
H ₂ O>105°	2.19	8.86	1.13
H ₂ O<105°	0.54	6.04	0.73
TiO ₂	0.36	0.55	0.35
P ₂ O ₅	0.32	0.48	0.75
Mn ₃ O ₄	—	—	4.55*
Mn O ₂	—	7.21*	—
Mn O	1.86	—	—
CO ₂	25.50	0.97	0.12
Allow for minor constituents	0.11	0.35	0.11
	99.90	99.80	99.73
	mg/kg	mg/kg	mg/kg
Ba**	370	1,780	120
Co**	<10	72	10
Cr**	20	54	26
Cu**	14	139	15
Ga**	<10	<10	31
Li	11	22	15
Ni	<10	100	<10
Rb	37	70	24
Sr**	53	66	41
V**	<10	72	46
Zr**	170	210	170
B	32	39	22
F	150	350	420
S	190	280	110

* All the manganese appears to be present in this form.

** Spectrographic determination.

Analysed by J. M. Murphy, J. I. Read and W. A. McNally.
Spectrographic work by R. G. Burns.

2. TECHNOLOGY

Broadly speaking there are two methods of extracting iron from its ore, the earliest of these is known as the bloomery or direct process, so named because it is a single stage method of producing malleable iron actually in the smelting furnace. The product was suitable for immediate 'working up' into objects. The second method is the blast furnace or indirect process of making malleable iron. It is in fact a two stage process, the first stage takes place in the blast furnace and consists of the reduction of iron ore to liquid

ANALYSES OF WEALDEN IRON ORES AND THEIR ARCHAEOLOGICAL SIGNIFICANCE

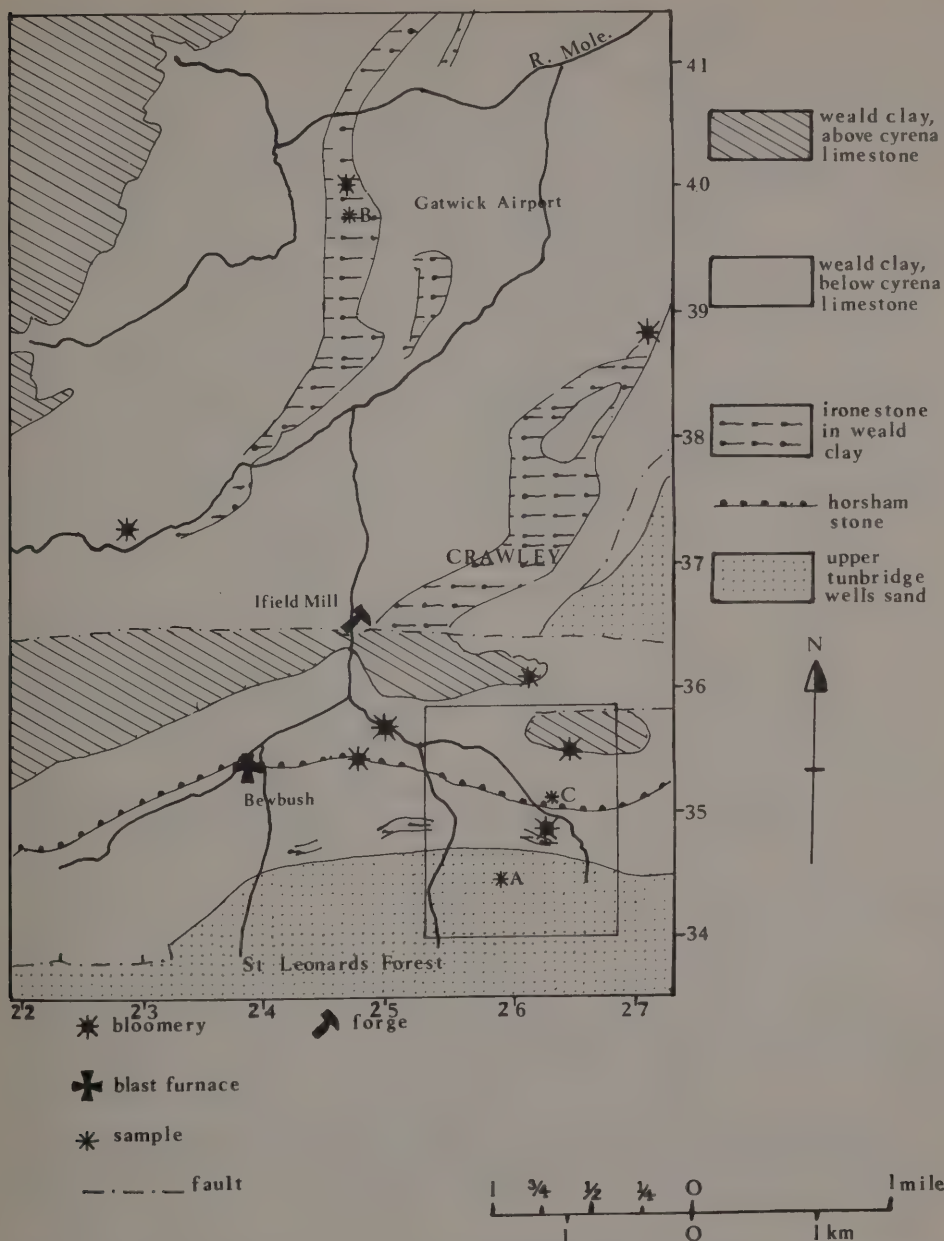


Fig.1 Geological sketch map of part of the area included in HN Sheet 302 to show sites of ironstone samples. National Grid 1 km. squares are indicated by numbers on the edges of the diagram. Square insert is area shown in Fig.2. Sample No.2488=A, 2489=B, 2490=C.

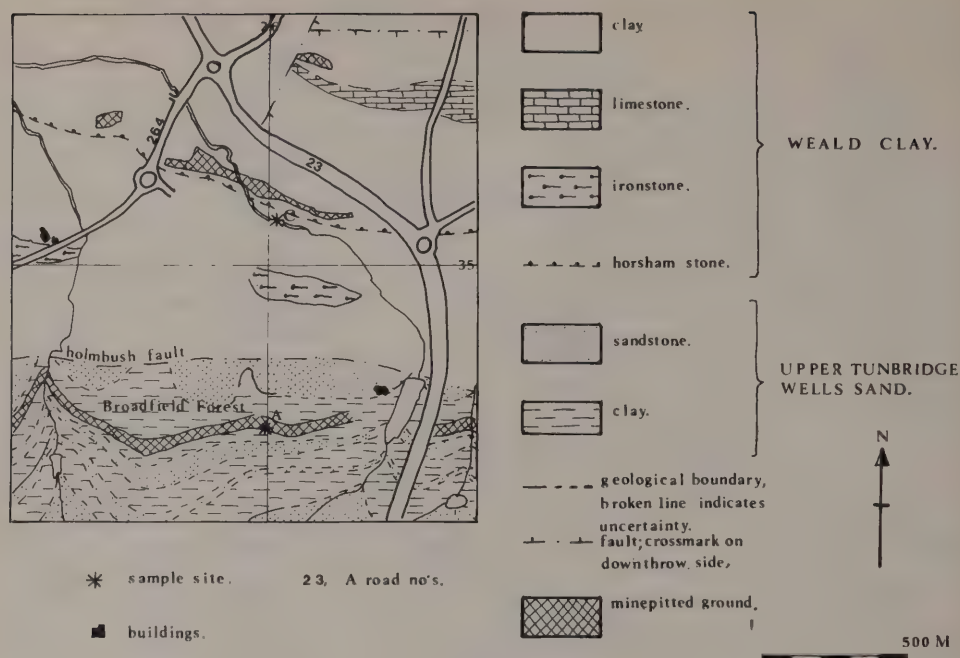


Fig.2 Geological sketch map of the Broadfields area, Crawley, West Sussex. Boundaries from 6-inch maps TQ23SE and TQ23NE, by permission of the Director, Institute of Geological Sciences.

metallic iron (a carbon alloy). This molten iron is tapped from the furnace and cast into either suitably shaped moulds or in the form of long bars. The second stage is to convert these bars into malleable iron. This is carried out in a finery hearth and involves the use of forge hammers. Commonly the blast furnace is separated from the finery, chafery and forge because of the need for adequate water-power, provided by the construction of dams on numerous streams in the Weald to form the 'furnace' and 'hammer' ponds. Such furnaces were not introduced into this country until the 16th century. While using vast quantities of charcoal as fuel it was possible because of increased efficiency to use a 'lower' grade ore (and possibly bloomery slag as part of the burden). The indirect process gradually seems to displace the direct process because it offered an economic means of increasing output.

It is not proposed to discuss the more modern method further, but to provide details of the direct process, which is well illustrated in this area by recent excavations of Iron Age and Romano-British industrial settlements.

3. ORGANISATION

In the Weald during the Roman period there were at least two groups exploiting iron ore deposits. A 'Coastal Group' (Cleere 1975 and Gibson-Hill 1975) centred in East

Sussex and Kent, and a 'mid-Wealden Group' whose sites are situated near to Roman roads that ran north-south through the Weald (Margary 1965).

- (a) 'Coastal Group':— connected for part of its history with the Roman Fleet (*Classis Britannica*). This group's products were mainly distributed by sea, via the port at Bodiam. Apparently the Fleet held a number of settlements (Bardown, Beauport Park and Little Farningham Farm) that acted as administrative centres, each controlling a number of satellite sites where smelting was carried out. A factor in the establishing of these satellites was localised exhaustion of iron ore which had been obtained from discontinuous horizons in the Wadhurst clay (Cleere 1971:208).

The primary area of activity seems to be centred around the Battle-Seddlescombe district, with a secondary sphere of influence spreading inland to include Bardown and its satellites. The fleet seems to have been active in the Weald during the late 2nd century to the mid 3rd century. The sites were then abandoned or dismantled. During this short period of time the 'Coastal Group' was to become the more important of the two areas.

- (b) 'Mid-Wealden Group':— distribution of the product relied on the London to Brighton and London to Lewes roads which were constructed towards the end of the 1st century AD. The industrial settlements, unlike those of the 'Coastal Group', had a relatively long working life, some dating from the Iron Age. For example Carbon 14 dates, from Broadfields so far, range from BC 190 ± 80 to 110 ± 80 . This static development may have been made possible by working the more continuous ore deposits of the Weald clay, which apparently were not subject to localised exhaustion. This group seems to have been primarily concerned with the mining and smelting of iron on such a vast scale that suggests some form of central control. Possibly run on the lines of an Imperial Estate, the road system and the later military intervention may substantiate this view.

4. MINING

The principal ore used in the Wealden iron industry was clay ironstone, composed largely of ferrous carbonate, in the form of the minutely crystalline mineral siderite. Clay ironstone has widespread outcrops in the Weald (see Figs. 1 and 2).

An outcrop clay ironstone weathers to limonite (ferric oxide) within 2 m. or so of the ground surface and disintegrates into small fragments commonly about 10 mm. in diameter. Locally, owing to solution and redeposition resulting from seasonally fluctuating water table, the fragmented material is cemented into hard lumps.

Provided that prospecting techniques were adequate to locate deposits of this material, its actual mining would have presented no difficulty, and there is a tradition of its former use as an ore (Lower 1849; Hart & Winbolt 1937) although doubt has been expressed as to the value of iron pan that occurs in the Haslemere area (Worssam 1964).

It was the object of analysis, Lab. No. 2489 (Fig. 1(B), table 1) to show if the iron content of this material from the Crawley area is high enough for it to have ranked as an ore. The sample is from a lump measuring about 20×10 cm. diameter, found loose on

the surface of a ploughed field on the outcrop of a clay ironstone bed (Fig.1). The specimen was found by Mrs. Jean Shelley of Crawley Local History Society. It is therefore a random sample in that it was not deliberately selected from a geological point of view. Similar material is not uncommon in the soil at Pit Croft. There are also some slight depressions of ground surface which could possibly be relics of former shallow excavations for ore. The clay ironstone bed, on the outcrop of which this weathered material was found, is believed to be at the infra-Horsham stone horizon of the Weald clay (Worssam 1972:45–6, 52). The parent material of the sample is therefore possibly similar to that of the roasted ore analysed as Lab. No.2490 (Fig.1(C)).

Analysis shows that this rock, like Lab. No.2490, has a high manganese oxide content. Because manganese goes into the slag in the bloomery process in preference to iron, and thus in a sense acts as a flux, Tylecote (1962:182, 191) suggests that in comparing analyses iron and manganese oxides should be considered together. The manganese oxide content of this ore added to the ferric oxide gives a combined percentage of 47%, which is higher than the iron oxide plus manganese oxide content of Lab. No.2488 (Fig.1(A)). The water content is higher than that of both other analyses and were the water driven off by roasting, material that might well have served as an ore would result, although high in silica and alumina.

There are probably several types of this iron pan. That which is most widespread in the Haslemere area is formed by the cementation of river gravels where the presence of sandstone or even chert pebbles may have given such a high silica content as to render the material of little value as an ore (Worssam 1964:530). Iron pan of the type now analysed, in that it consists essentially of limonite fragments concentrated in soil above an ironstone outcrop, is probably more iron-rich than most. Such material may well have been one of the earlier ores to be used in the Weald.

In the Weald, iron ore below the level of weathering, where not a by-product of marl pits (Straker, 1931:101) was obtained mainly from cylindrical shafts or pits. Evidenced by pock-marked ground in the vicinity of ore outcrops, the remains are circular depressions from 3 m. to 6 m. in diameter, covering patches of ground which have well defined boundaries. The down dip boundary was presumably governed by the economic depth of working and the limitation of the primitive open-cast mining techniques (Worssam 1964, 1972). The term mine-pit is still used locally for these depressions (mine equating iron ore in the Sussex vocabulary). Unfortunately, these pits are largely undated and inherent difficulties in their excavation are likely to preclude examination in the Crawley area for some time to come. However, at Petleywood, Battle, Sussex a series of pits up to 20 m. in diameter was discovered, an excavated shaft tapering towards the base was 15 m. deep. Mining debris scattered around the 'pit-head' contained large quantities of second and third century pottery, also there was evidence for ore-roasting and screening (Lemmon 1951).

As the pits are commonly filled in the actual seam for which particular pits were dug is rarely exposed. However, in July 1973 a sewer trench in the Broadfields Forest, south of Crawley, was dug across a nearly continuous belt of minepits, only 30 to 40 m. wide,

that runs for 4 km. from Silver Hill (TQ 235–340) almost to Tilgate (TQ 275–345). (Fig.1.) The belt lies on the outcrop of a clay member of the Upper Tunbridge Wells Sand formation. Although the trench had been backfilled for most of its length when first visited, it was fortunately open over a distance of about 20 m. and to a depth of 2 to 3 m. in the vicinity of the minepits. It there exposed (at National Grid Reference 25983443) about 6 m. of strata, dipping at 6°NNW.

These strata are composed of hard sandstone, siltstone and silty mudstone layers at the base, seen for 2.8 m. and representing the sandstone bed (Colgate Sandstone) which crops out near to the sample site for Lab. No.2488 (Fig.2(A)), overlain by about 3 m. of silty clay which included, at 1.7 m. above the sandstone, the continuous seam of light grey sideritic siltstone, 8 to 16 cm. thick, analysed as Lab. No.2488, which in all probability was the main ore seam for which the minepits were dug. The siltstone is a hard, dense rock that weathers to limonite along joint surfaces, producing ferruginous 'box-stone'. The analysis shows the content of iron oxides to be about 40% by weight, which is low for an iron ore, while the manganese oxide content is also low and the silica (22%) is high.

The date of these minepits is not known, though their wide extent suggests (Worsam 1972) that they supplied blast furnaces in St. Leonards Forest which were of 16th–17th century date. However, an open part of the sewer trench (TQ 25943451) showed bloomery slag to a depth of 2 m. below the ground surface, apparently filling an old excavation. This slag, if the product of furnaces in the immediate vicinity, may imply pre-16th century working of iron ore in the forest.

On the Broadfield site medieval and post-medieval pottery has been recovered from stratified levels above the Roman slag dumps (and elsewhere on the site) in association with truncated layers and depressions indicating that the dumps were robbed. In the medieval period slag was used as a substitute for stone in the construction of buildings. For example during the excavation of a Medieval Hall in Crawley the floor was found to be made up of tap-slag fragments (Armstrong, Gibson-Hill forthcoming). In the 16th century and later the robbed slag may have been used as part of the burden in blast furnaces.

5. ROASTING

Carbonate ores benefit from roasting because this converts the carbonate to Fe_2O_3 , removes carbon dioxide and combined and uncombined water. The most important effect was to make the ore porous so that it would be able to accept and react to the reducing conditions inside the smelting furnace. In the smelting stage the size of the roasted ore fragments was quite important since carbon monoxide would take longer to penetrate and reduce large pieces while too small fragments would be detrimental as they would tend to clog areas within the shaft. At Ashwicken the size of the ore charge averaged 60 mm. \times 25 mm. \times 25 mm. (Tylecote & Owles 1960), at Bardown they were 38 mm. cubes (Cleere 1970a:15), while at Broadfields 30 mm. cubes were used. The natural carbonate ore is a light-grey colour which changes when roasted to a reddish-purple (Fe_2O_3 haematite). In

some cases partial reduction took place (Fe_3O_4 magnetite) bringing about a further colour change to blackish-blue.

In modern reconstructions roasting seems to have had its dangers for the operators, as lumps exploded violently during the process (Cleere, 1970b). The roasted ore would, it appears, have been easier to break into the desired size than natural ore. In all probability the relatively easier fragmentation of the ore and the prevention of it exploding in the smelting furnace were paramount in the smith's mind.

Roasting of a carbonate is carried out in oxidising conditions, at approximately $300\text{--}400^\circ\text{C}$ according to Cleere (1970a:7) but recent work using a technique known as thermo-gravimetric analysis (TGA) shows that 'carbonates lose up to 30% by evolution of CO_2 in the range $500\text{--}550^\circ\text{C}$ ' (Tylecote 1975:26). The need for control over the operation was emphasised (Jones 1974, Cleere 1970b) and is, perhaps, substantiated by the discovery of elaborate ore roasting furnaces (Cleere 1970a). The furnaces fall into two main groups: (a) the trench type, and (b) the oval or pear-shaped pit.

(a) Trench type. Two of these furnaces were discovered at Bardown (Fig.3A) and consist of a trench cut into the natural clay, this was lined on three sides by sandstone blocks and open at one end, the whole being surrounded by roasted ore fines which were associated with several flagon necks that had been used as tuyeres (Cleere 1970a). Features of similar design have been found at Tiddington, Warwickshire

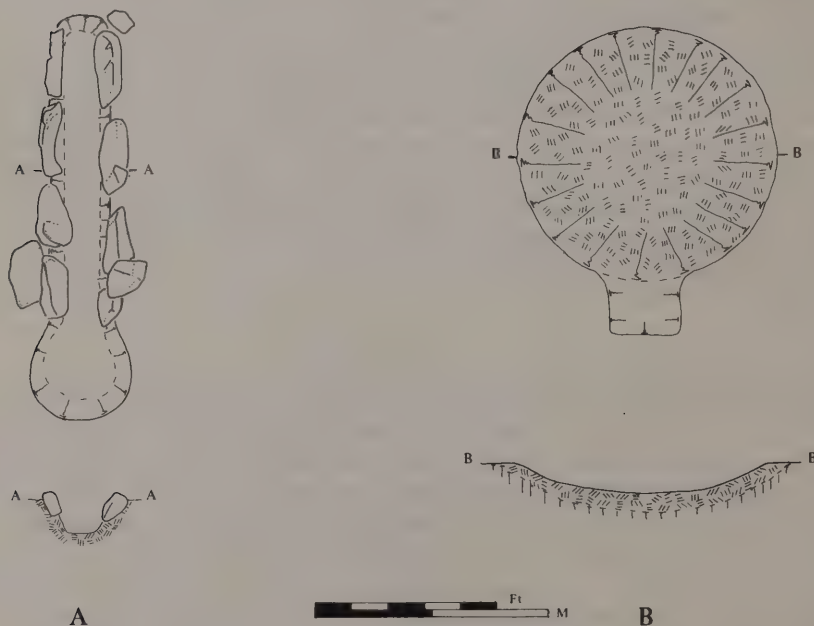


Fig.3 I A Plan and section of a trench type ore roasting furnace (after Cleere) 2nd century AD.
I B Plan and section of a pear-shaped ore roasting furnace (after Dakin) 2nd century AD.

and Wilderspool, Lancashire, although the function of these furnaces is not clear, (Tylecote 1962:235).

- (b) Pit type. Perhaps best illustrated by the discoveries at Bedford Purlieus (Dakin, 1968:66–67). There were two furnaces, one oval in plan approximately 2 m. in diameter with a maximum depth of 43 cm., and a more complete example which was pear-shaped, 2.13 m. in diameter and 23 cm. deep (Fig.3B). They are both similar to the furnace found at Great Casterton which was pre-packed for roasting (Tylecote, 1962). To date no examples of this type of furnace have been found in the Weald.

At Broadfields ore roasting was carried out in an open fire during the first and early part of the second century AD. The remains indicating this method are mainly small areas of burnt clay and roasted ore, but these features were badly damaged by ploughing. Fortunately, one of the ore roasting areas had been covered by a slag-dump thereby protecting it from the plough and allowing the full extent of the feature to be revealed. These remains consist of an oval area of burnt clay measuring 11 m. in diameter and set into a slight depression. The colour variations of the burnt clay have been interpreted as the result of numerous small fires being repeatedly set in the depression. Separating the feature from the slag was a layer of ore fines up to 77 mm. thick. (The ore had apparently been screened to exclude -7 mm. cubes). These fines were mostly reddish-purple but some were blue-black in colour. Around the periphery some unburnt nodules were found. The remains of similar roasting areas have been found at Minepit Wood (Money 1974), Petleywood (Lemmon 1951) and Ridge Hill (Straker 1931).

The sample of roasted ore analysed as Lab. No.2490 (Fig.2(C)) occurred in the form of cuboidal fragments measuring about 30 mm. along the cube edges. These fragments formed a small pile on a 'working floor' adjacent to a bloomery smelting furnace of the 'Wealden' type (Plate I). The furnace, dated to the Antonine period, had been relined on several occasions (Plate II) before being demolished, its collapsed superstructure forming a thick layer sealing the roasted ore.

The fine grained nature and general appearance of the ore fragments in the sample suggests they were originally clay ironstone from the Horsham Stone horizon. A belt of minepits dug for this ironstone passes close to the settlement, it thins as it nears the north western perimeter ditch, as if to avoid the area, and returns to its full width just past the north eastern corner. This could be an indication of a Roman date for these pits, but confirmation will have to await excavation.

The rock fragments in the sample are of a reddish-purple colour with a powdery surface which readily impart a reddish-brown stain to one's fingers when they are handled. The analysis shows that siderite has been almost completely converted to haematite by expulsion of carbon dioxide. The manganese oxide content of the ore is high, and added to the ferric oxide content gives the high figure of 78.35%. The small amount of calcium oxide present is also likely to have assisted fluxing (compare Tylecote 1962:187).

Whereas at Broadfields the roasting process produced an ore that is of high grade by any standards, analysis of the Horam ore shows that roasting there resulted in no great

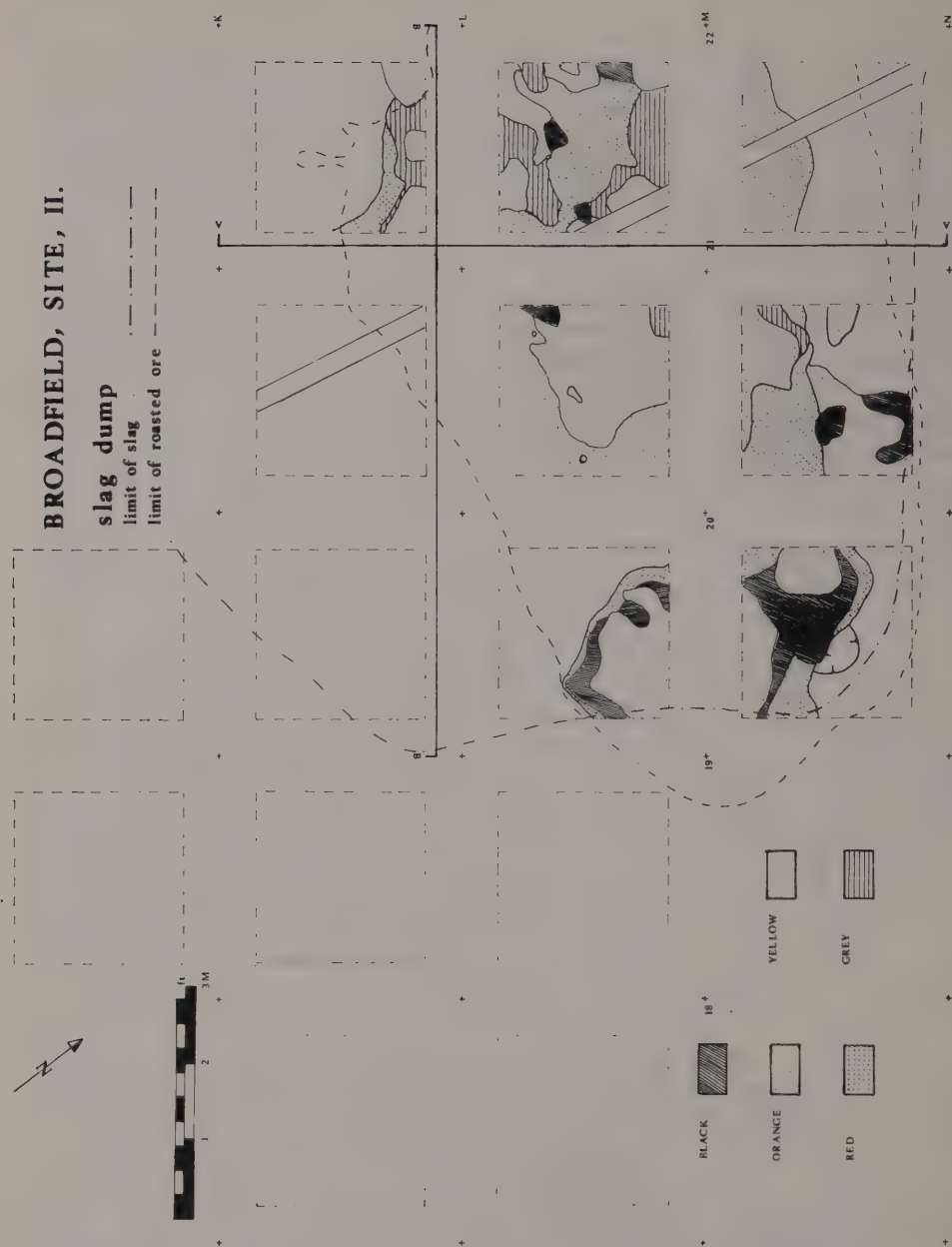


Fig. 4 Plan of burnt clay area at Broadfields, Site II, representing the remains of ore roasting via the open fire method. Late 1st century—early 2nd century AD.



Plate I Free standing shaft type smelting furnace, showing section of slag tapping bay, the roasted ore sample was taken from the foreground. Broadfields, Site II. *(Photo by P. J. Wyles)*

chemical change (Cleere 1970b) and further examination showed the main difference between roasted and unroasted samples at Horam was that the former had a thin layer 1–2 mm. thick which had been converted to haematite. If the results of this reconstruction reflect the results obtained in antiquity, then it would seem that roasting in an open fire was equally, if not more, effective than the more ‘elaborate’ furnaces. Perhaps this is an indication that the choice of method was little more than local preference or that the furnace was selected according to the quantity of material required. The results apparently being dependent on the judgement of eye, would cause varying results with all methods mentioned above, relying as they must have on the skill of the operator.

6. SMELTING

Reduction of iron from its ores takes place well below its melting point at 1540°C in strong reducing conditions. The charge consisted of roasted ore and charcoal, the combustion of the charcoal in the air blast produces carbon monoxide gas (CO) and it is the upward passage of this gas and the presence of hot carbon which affects the reduction of the ore. Small particles of solid iron are produced but are separated by unwanted material in the ore, known as gangue. The gangue appears in the analyses as oxides of silicon, aluminium and calcium.



Plate II Free standing shaft type smelting furnace, showing detail of relining and front arch area.

(Photo by P. J. Wyles)

During the process the gangue is separated by slagging, the slag being extracted by liquidation. Therefore, smelting must take place at a temperature high enough (approximately 1200–1300°C) for the slag to become fluid and to drain from the solid iron thus enabling the separate iron particles to sinter or weld together to form a block of malleable iron. Some of the viscous slag coats the particles of iron and prevents reoxidation but does not stop their coming together. The bloom forms not at the base of the furnace but usually just above the entry point of the air blast. Blooms consist of a solid mass of iron interspaced with slag and gas pockets.

After sufficient iron has been reduced, say after a day's working, the bloom is removed from the furnace. It needs to be consolidated to close up the pockets of slag and gas. This is achieved by reheating to a temperature above the softening point of the slag and by hammering, the inclusions being squashed out from where they are trapped.

In the Weald there is good archaeological evidence for three main types of bloomery smelting furnaces.

Isolated examples of Dome furnaces have been found at Pippingford (Tebbutt and Cleere 1973) and Minepit Wood (Money 1974). Both comply with Cleere's classification B.1.ii. They were approximately 60 cm. in diameter and 40 cm. high. Far more common are the remains of free-standing shaft furnaces, known as the 'classic Wealden' type, originally measuring approximately 1.25 m. high and 69 cm. in diameter. Twelve of these furnaces have been found at Holbeanwood (Cleere 1970a) and a further thirty at Broadfields. They, like the dome furnaces, had facilities via an aperture known as the 'Front Arch' (Plate No.1) for slag tapping and the application of forced draught, complying with Cleere's classification, Group B.1.i. (Cleere 1972). The final type, while similar to the above, are fabricated out of a prepared clay base, the cylindrical shaft being set into a low bank. This furnace type is frequently laid out in rows of three or six furnaces adjacent to each other and uses a communal slag tapping bay (Gibson-Hill 1974, 1975, 1976). Such groups have been found at Broadfields, Ashwicken, Norfolk (Tylecote & Owles 1960:142–182) and Stamford (Tylecote 1969:24–27). They also comply with Cleere's B.1.i. This classification concentrates on function and ignores morphological aspects. The furnace described above illustrates the short-comings of this approach, i.e. the bank provides greater mechanical strength besides giving improved thermal properties to the superstructure, also the communal slag tapping bay implies a variation in the method of operation.

Abstract

In this paper the authors report on field-work in the Crawley/Horsham area and on the subsequent analysis of three Wealden Iron Ores.

The main points are as follows:—

- (a) It is clearly demonstrated that a certain type of 'Iron pan' found in the area would qualify as an iron ore.
- (b) That variations in the method of operation practised in the Romano-British iron-works of the 'mid-Sussex' and those of the 'Coastal Group' can, in part, be explained by the quality of consistency of their respective sources of raw material.

- (c) Analyses show that the Ironstone found at the infra-Horsham stone horizon was the major source of raw material during the Roman Period in this area.
- (d) The sideritic iron ore obtained from the Tunbridge Wells horizon was only fully utilised when Blast Furnaces were established in St. Leonards Forest.

The 'Iron pan' mentioned above is in the form of weathered clay ironstone from the infra-Horsham stone horizon (Lab. No.2489) and was probably one of the earliest sources of ore to be exploited in the Weald. Its presence on the surface of fields above the parent material would also provide an easy way of locating the seam. In the 'mid-Sussex' area, clay ironstone of the infra-Horsham stone Horizon (analysed as Lab. No.2490) satisfied the needs of the Late Iron Age and Romano-British iron-works. Its abundance facilitated a static development and once the settlements had been established they continued in use for a relatively long period. Among the 'Coastal Group' however, where iron ore was obtained from discontinuous outcrops in the Wadhurst clay, localised exhaustion was common enough to make it necessary to establish satellite industrial sites on fresh outcrops.

The analysis of the roasted ore has provided evidence that eliminates certain mining areas and indicates the probable area in use during the Roman period. On this basis the belt of minepits on the Tunbridge Wells sands, situated south of the Broadfields settlement, can be ruled out as a source of supply. These pits were dug to obtain a sideritic siltstone (Lab. No.2488) which is a relatively low grade ore, yet it was extensively worked on a scale that suggests its use in later blast furnaces.

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APPENDIX

There follows brief details of the iron working sites shown on Fig.3.

Bewbush Blast Furnace, TQ 238357

The only blast furnace site to occur in the area, was originally called Ifield Furnace when worked by Roger Gratwick in 1574. At the time of the Commonwealth Bewbush belonged to Thomas Middleton, the Member for Horsham in the Long Parliament, who was suspected of complicity in the Royalist rising of 1648 at Horsham. As a result his estates were sequestered. In a parliamentary survey dated 16th March 1649 there is the following note:-

'Furnace and Iron Mine - There is one old furnace standing at the lower end of the great furnace pond, and store or iron mine, but the aforesaid Mr Thos. Middleton and his predecessors have destroyed the woods and timber with more abounding upon the several parks of Shelley and Bewbush and neglected to follow the said furnace, that it hath stood emptie for about seven

years last past. The said old furnace if it be repayed will be worth with the benefit of the mine within Bewbush lands, £20 per annum.'

The very high fuel consumption of the blast furnace can be illustrated by transactions that took place during a seven year period (namely 1589–1596) when 56,000 cords of wood, worth £4,200, were cut down in the estates mentioned above. The furnace never worked again, being reported as a ruin in 1653 (Straker, 1931:458–459). Its pond, now drained, will disappear under a new housing development. There is little to see on the site itself and even the blast furnace slag is hard to find.

Bewbush Bloomery, Site A. TQ 247357

Discovered in 1975 by the authors who found some tap-slag in a wood adjacent to the south-eastern end of Ifield Pond. A short time later, the construction of a trunk sewer system exposed what appeared to be a section of a slag dump measuring approximately 26 m. × 18 m. The exposed portion stood 69 cm. high. 24.5 m. east of the dump a ditch, 'V' shaped in section was revealed. This was filled with slag and two post pits found nearby had a slag-packing. Undated.

Bewbush Bloomery, Site B. TQ 245355

Lies to the south of Site A in what is now an open field (though due to be built over) and is represented by bloomery slag covering a circular area of about 20 m. diameter. The site was discovered by one of the authors (Worssam) in 1975. Undated.

Broadfields. Iron Age and Romano-British Bloomery TQ 262353–TQ 265355

Domestic and industrial areas which are thought to cover 12 hectares were revealed by 'rescue' excavations in advance of a substantial building development at Broadfields and Southgate West. Many of the stages in manufacturing iron by the bloomery process are represented by features which include ore-roasting areas, three slag dumps, forty smelting furnaces, puddling pits, a water reservoir and blacksmith's workshop.

The site spans a shallow valley with sandstone hills to the south. The main occupation is at the base of these hills at 80 m. above sea-level on Weald clay. One of the excavated domestic settlements was found to be surrounded by a ditch and low bank, enclosing a rectangular area, measuring approximately 76 m. × 63 m. Two substantial buildings were uncovered inside this area, as well as various post-pits and walls indicating others, but modern disturbance made further identification hazardous (Gibson-Hill 1975 and 1976). In the north east corner of the enclosure a rectangular area of slag and furnace debris has been interpreted as a hard standing for transport.

Cindery 17, Bloomery. TQ 269375

This site was completely destroyed by housing development in the late thirties. It was, however, recorded by Straker (1931:468) who commented on a large area of slag occurring in several fields. Undated.

Goff's Park, Bloomery. TQ 263363

An Iron Age industrial settlement that was discovered by Mr M. Iwach who was watching a small housing development for the Crawley and mid-Sussex Archaeological Group. Two ditches running parallel to each other around the contours of a small hill had been exposed. Both were roughly 'V' shaped in section and contained great quantities of bloomery tap-slag, roasted ore, charcoal and pottery. The latter consisted mainly of a ceramic style of the Eastern Atrebatian Group (c. 50 BC–43 AD) (Cunliffe 1974:91–106, 344) as well as some earlier types. Aerial photographs of the site showed two circular shapes within the area enclosed by the ditch, these are thought to represent the remains of dwellings.

Similar pottery to that described above has been recovered from the earlier levels at Broadfields and it would seem that Goff's Park was the settlement for the first iron workers to exploit the ore from this area.

Ifield Forge. TQ 245365

Apparently worked by Roger Gratwick in 1574, who incidentally operated other forges in St. Leonards Forest for Queen Elizabeth I. It was one of many workings in the area destroyed by Col. Waller in 1643. During the forge's working life it serviced the Bewbush blast furnace. No further work was carried out on the site after the Civil War and a corn-mill was erected here in 1683. Subsequently the building was modified and finally rebuilt at the end of the 18th century.

The pond is still in water and blast furnace and forging slag can be found in great quantities on the site and in the stream bed.

Straker (1931:460) when visiting the site noticed 'a curious mitre-shaped block of stone, with a round hole through it, perhaps a bellows counterpoise'.

ANALYSES OF WEALDEN IRON ORES AND THEIR ARCHAEOLOGICAL SIGNIFICANCE

Pit Croft, Bloomery. TQ 249403

Another recent discovery was a large area of bloomery slag in a field that lies on an outcrop of clay ironstone. Medieval.

Stumbleholm, Bloomery, TQ 238374

Straker noticed a 'considerable area of bloomery slag' during the construction of a barn (1931: 458). This spread into the adjacent fields. The area, still farm land, is under grass and not threatened by development. Undated.

Summaries of M.A. and M.Sc. Reports

1974/75

Status of the Women Listed in the A Series of Tablets from Pylos

The Aa-Ab women are generally assumed to be slaves or fugitives assisting in the emergency measures taken against coastal invaders. Yet no tabular or archaeological evidence conclusively proves either the existence of slave labour in Messenia or Messenian foreknowledge of an enemy attack.

Recent economic analyses of the Linear B tablets by J. Killen and J. Hutchinson provide firm ground for comparing the status of the English feudal villein and the Messenian Aa-Ab-Ad personnel. Legally free, in practice unfree, villeins were obliged to perform seasonal/boon-work for the Lord who fed them in return for their services. Women and children did domestic and light agricultural (ie. sheep-shearing) chores and men, in addition to agrarian duties, had to serve in the militia.

The Aa and Ad tablets are, then, lists of 'villein' families, of the available, cheap, dependent labour in Messenia. The Ab ration list records a 'boon-service' period carried out by the women – probably that of sheep-shearing and the preparation of the wool for regional distribution.

This suggestion broadens the simplistic division between slave and freeman previously applied to Mycenaean society when discussing the 'A' personnel and assumes a more complex social structure which would naturally accompany a bureaucratic, centralised economy.

Ann Baron

Aspects of Water Transport in Roman Britain

The paper begins by describing traditional Graeco-Roman merchant ships, and it is established that there is no reliable evidence for any such ships' having exceeded 500 tons. The cases for larger ships put forward by Testaguzza and Casson are rejected – because of their inconsistency with ancient sources and the practical problems that they raise.

In Britain itself, evidence for Roman merchant shipping depends mostly on the three London boats. It is suggested that these are examples of a provincial school of Graeco-Roman shipbuilding rather than an entirely separate tradition: many features of all the ships, even the seemingly heterodox New Guy's House Boat, can be paralleled in Mediterranean wrecks.

The Roman canals in Eastern England, usually regarded as navigable waterways, are here argued to be drainage channels, on the grounds of siting, date, design and other factors. Their possible role in occasional transport is considered.

Finally, it is argued that these reassessments, together with a study of the siting of towns and villas, and of the distribution of pottery in the province, all suggest that water transport was not as important to Roman Britain as previous works have suggested.

R. I. Burn-Murdoch

A History of New Guinea Highlands Vegetation: an argument concerning the effects of agriculture

The main theme is the prehistoric development of intensive agricultural systems in parts of the highland valleys of New Guinea, within an area generally dominated by long-fallow swiddening.

The physical characteristics of the Highlands are reviewed, with particular attention being paid to soils, temperature and rainfall variations with altitude, the nature of recent vegetation patterns, and arguments concerning the structure and stability of tropical mountain plant communities.

The available palynological records are examined, and the effects of agricultural practices, and especially of burning, on the vegetation are discussed.

Agricultural strategies in parts of the western and central Highlands are then examined in the light of general propositions about the longterm stability of swidden agriculture and several single-factor explanations for the transition to intensive monocrop agriculture such as population growth, improved technology, migration and the introduction of new crops are examined and considered inadequate.

Recent archaeological evidence indicates that intensive agricultural systems are many thousands of years old, at least in the valley bottoms, and probably long predate the introduction of sweet potato. An explanation is offered that intensive agriculture was developed as a response to water control problems in the broad montane valleys and coexisted there with swidden systems, but over time, large areas of grassland developed leading to severe pressure on easily cultivable land. The introduction of a frost-tolerant staple, sweet potato, then allowed an expansion of agriculture on to the higher slopes where its intensive cultivation was the only successful agricultural strategy feasible.

K. Gollan

A Survey of Domestic Architecture in Neolithic Cyprus

This survey catalogues information about domestic architecture reported in the literature on the Neolithic of Cyprus. In describing the remains, the dissertation emphasises signs of contemporary cultural contact between different parts of the island, and of continuity in architectural traditions. To a lesser extent it seeks evidence of environmental conditions, social requirements and ideological proclivities encountered by the builders and inhabitants of the buildings described. It relates recent work by Watkins at Kataliontas, LeBrun at Cape Andreas, Watkins at Philia-Drakos, and Peltenburg at Ayios Epiktitos Vrysi to the earlier research of Dikaio and Gjerstad on the Neolithic of Cyprus.

The survey recognises two architectural styles in the Neolithic I, and that some house plans, construction techniques, and fixtures are so similar at aceramic and pottery-using sites that a degree of continuity is suggested. Other house plans, relationships between buildings, and the use of new techniques indicate a completely new element in the Neolithic II. The survey uncovers no conclusive evidence for trade in building materials, but shows that the environment of the Neolithic was moister and more verdant than now. It also indicates religious or aesthetic preferences in building design, orientation and installations.

Alice Kingsnorth

Exploitation of Wild Animal Resources by the Ancient Maya

The subject matter of the report has been divided into two parts. The first considers the different purposes for which the animals were exploited and the second part discusses the technology utilised for obtaining them. As a preliminary to these two sections the types of relevant information have been reviewed and the difficulties in their interpretation have been discussed.

The first part makes use of archaeological reports, Maya manuscripts and historical and ethnographic material. It has been subdivided into five sections: Subsistence, Clothing, Head-dresses and Ornaments, Ceremonial, Medicinal and Utilitarian. As the section on Subsistence comprises by far the most information it has been further divided into the following subsections; Land Mammals, Game Birds, Reptiles, Aquatic Animals and Bees.

The second part makes particular use of Maya codices and comparative ethnographic material. It has also been divided into four sections which consider in turn the technology relevant to the obtaining of Land Animals, Fish, Sharks and Manatees and Marine Molluscs. A fifth section considers the possibility of the semi-domestication of deer.

It has been demonstrated that wild animals were utilised for a wide variety of different purposes of which subsistence was the most important. The results of this report suggest that the Maya exploitation of their animal resources was broadly based and that they were not unduly dependent on any one resource. From the technological aspect the Maya demonstrated considerable ingenuity in view of the limited resources available to them.

C. M. Pestell

Fenestrated Stands with Handles from Second Millennium Canaan

A brief survey of early scholarly efforts at formulating a typology of fired-clay stands is followed by outline drawings and short descriptions of thirty fired-clay stands which are unique by virtue of having handles as well as fenestrations. The examples cited come from Ai, Beth-shan, Hazor, Lachish, Megiddo, Nahariyah, Shechem and Ugarit, plus one from Billa in N. Mesopotamia.

A section of comparisons and discussion begins by establishing the chronological positions of the stands. After that come considerations of their find contexts, forms, handles, decoration and fenestrations.

Instead of confirming a suspicion that we might have a 'Canaanite' cult-stand tradition, indicated by the presence of handles in particular, we learned that most of the indicators point to the late third or early second millennium regions of Syria—Mesopotamia as the probable origin for the handled-stand tradition, although no examples are known from that early date.

The second major conclusion which we drew from the study of these stands was that they reflect a three-phased history of fenestrations which might serve as a clue to the cultural history of ancient Canaan. The three phases are: (1) an early, waning tradition of rectangular and then triangular fenestrations clearly related to the Syria—Mesopotamia world; (2) a new tradition of combined circles-ovals style of fenestrations, probably born during the fifteenth century, and possibly with coastal/Minoan origins; and (3) a renaissance of the older styles of fenestrations probably as a result of presumed Iron I foreigners bringing these traditions with them.

Richard Schieman

Animal Palaeopathology and Archaeology: possibilities and problems

A descriptive account of the aetiology, morphology and incidence of the range of pathological disorders affecting the osseous tissues of animals (mainly mammals) is given to indicate the possible lesions which might be encountered in archaeological contexts.

Though palaeopathological bones specimens have been described since at least the eighteenth century, it is only in relatively recent years that an interest in archaeozoological material as affording much of potential value has grown sufficiently to begin to make inroads into advancing the methodology and interpretation of such specimens. Despite the pessimism of some workers in the field, it has been shown that indeed this material does persist in the archaeological record, and that while diagnosis is not always clearcut, some of the spectrum of bone changes induced by disease processes has been documented in the archaeological literature.

As early as 4000 years ago an awareness of some of these conditions was recorded, with several of these early societies adopting preventive and therapeutic measures to deal with them. As man came into increasingly more intimate contact with animals, transmission of infectious disease was facilitated; husbandry practices, too, have been seen to be directly related to the incidence of certain conditions, the occurrence of which in archaeological material yields an insight into such practices.

Diverse data of archaeological significance is, in fact, retrievable not only from osteological faunal remains, but from organic material which perseveres under particular conditions. The impact of animal disease is far-reaching, with important implications not only for the economy, but for human well-being as well.

Jane Siegal

Summaries of Undergraduate Reports

1974/75

An Analysis of Morphology and Retouch on a Bladelet Assemblage from Ksar Akil

An assemblage of 448 bladelets from Layer X (Levantine–Aurignacian) of the Ksar Akil rock-shelter (Lebanon) was studied in order to understand some of the mechanical factors behind the application of retouch to the bladelet.

The investigation entailed recording important features of the bladelet morphology and classifying the various patterns of retouch so that a correlation could be made between morphological groups and retouch types.

The correlation was performed using graphical and tabular techniques. The standard deviation was employed to arrive at statistically meaningful morphological groups. The results of the analysis revealed a low level of specification in the selection of morphological types – only certain struck bladelets being undesirable for the application of modal retouch types. There was some evidence that certain forms of retouch were consistently applied to correct morphologically deviant pieces.

Maurice J. Anslow

Pollen Analyses from Early Christian Contexts in Iona

Pollen analyses of samples taken from the soils buried under the Early Christian vallum on Iona, have produced evidence of extensive pastoralism in pre-Columbian times. It would seem that this pastoralism is more intensive than that one would expect from this small Iron-age community of Dun Bhuirg, and that it is possibly due to the existence of a larger settlement on the east of the island. The appearance of large proportions of heathland plants in the latest phase of the analyses suggest a period of desertion of the island immediately prior to the construction of the vallum. The absence of evidence of agriculture of any sort above this heathland phase in either of the analyses suggests that both sections of the vallum from which samples were taken were of the same early date of construction.

N. D. Balaam

Sediment Analysis and Periglacial Landforms as Evidence of the Environment of Southern England During the last Glaciation

New data from the Sussex coast provides the basis for a discussion of the Last Glacial environment of Southern England.

Cryoturbations, stone stripes and unsorted polygons were studied in plan and section during archaeological excavations at Newhaven. The polygons were probably formed by ice wedging; they contained flint artifacts in an aeolian sediment. The stratigraphies of eight other sites, four of them dry valley fills, are described. Sediments were analysed by determining the particle size distribution and the mineralogy of the sand and gravel fractions. Mineralogical analyses shows that loess was an important component of the Weichselian stratigraphy.

From these observations and from published sources the climate and depositional sequence of the Weichselian is outlined. An early phase of cold, damp conditions is represented by coombe rock deposits, solifluction terraces and cryoturbations. Many dry valleys assumed their present form at this time. This was followed by a cold, dry phase of loess deposition, then by zone I chalk meltwater deposits, interrupted by a zone IB (Bølling) soil. In zone II an Aherd soil developed and was subsequently covered by chalk meltwater deposits of zone III. The implications of this periglacial sequence are discussed with reference to Palaeolithic sites and the development of the post glacial soil.

M. Bell

Chimu and Related Material from the Bolivar Collection, Museum of Mankind. (Catalogue no.1907 3/19, American Series.)

The first part of this dissertation details in two main groups, that portion of the collection chosen for study; numbers 1–52 cover the ceramic group, which includes a small carved wooden work box; numbers 53–77 are the textile pieces.

Following the catalogue, the main section of the dissertation discusses the ceramic and the textile evidence and attempts to evaluate the significance of this material within the context of Middle Horizon through to Late Intermediate stylistic developments on the North and Central Coasts of Peru.

Elizabeth J. Carter

Bronze Boar Figurines in Iron Age and Roman Britain

This is a survey of a series of bronze figurines from Britain, most of which depict boars, although one is of a sow and some may be domesticated pigs. They are all reputed to be Iron Age or Roman in date. The traditional dating is confirmed in all but one case; it is suggested that the boar from Guilden Morden, Cambs. is Anglo-Saxon. Each figurine is discussed with respect to possible place of origin, date of manufacture and present condition. Unfortunately, of the twenty-two figurines known to the author, only three of the boars come from stratified contexts (Lexden Tumulus, Essex: Meare, Somerset: and Munthan Court, Sussex). Three of the boars are now lost. The text includes a discussion of the importance of the boar in Iron Age society. Appendix A is a brief list of the more important Celtic boar figurines from Europe. Appendix B gives the essential details concerning the British boars. Those which are still extant were drawn and photographed.

Jennifer Foster

A Deposit of Leather from the City of London

A deposit of leather was examined from Mr T. Tatton-Brown's excavations on the Customs House site in the Summer of 1973. The deposit was a large one, preserved mainly in layers of peat and organic material. Only 3 complete shoes were identified: two infants' and one adolescent's of similar style, ie. a bootie with a side opening fastened with thongs or laces, and uppers reaching to the ankle. There were 1007 pieces of sole, amongst which were 51 whole examples, ranging in size from 29 to 12 cms. in length, of varying shape, though most were round-toed. Six different styles of upper were positively identified, the majority broadish with a round toe and button or thong fastening. There were also a number of knife sheaths in a good state of preservation, all embellished with incised or stamped decoration comprising of geometric or heraldic design.

The deposit was thought to represent waste from a cobbler's shop, as there was a very large quantity of scraps and off-cuts, and damaged or worn pieces. From parallels with other sites, principally that of Lund in Sweden, and from evidence of associated finds and structures on the Customs House site, the deposit was dated to the early-mid fourteenth century.

Jennifer A. Jones

J. C. Buckler, Tackley's Inn and some more Medieval Houses in Oxford

The demolition of Nos.108–12 High Street, Oxford in 1872–3 for the building of King Edward Street was closely followed by J. C. Buckler (1793–1894), an architect and prolific topographical artist. His interest in medieval buildings and the origins of their study is discussed. Buckler's many drawings and description of discoveries on the site, never yet published, are analysed and rearranged, to produce a coherent account of the buildings. Some features are added to previous accounts of Tackley's Inn, and its detached medieval kitchen is identified. Three other hall-houses are described. One had an unusual blank arcade of two large arches in the upper wall of the hall. Floors were inserted in the halls in the late medieval period and the fronts of two houses were rebuilt with substantial timber frames, which Buckler recorded in great detail. A date of 1469–72 is suggested for one of these, on the basis of large expenditure on the property by Oriel College. This has important implications for

the dating of some timber joints. The addition of three unknown medieval houses to the few surviving examples in Oxford is of importance locally but is also of significance for the study of town houses in general.

J. T. Munby

The Mesolithic and Neolithic in Britain: suggestions for future research

It is proposed that a profitable way in which to study the Mesolithic and Neolithic in this country would be to think in terms of a culture system model, in which the archaeological culture represents the material culture subsystem. The diminishing concern with identifying cultures is noted, and an explanation offered that this is largely the result of a misunderstanding of the concept of a culture, associated with a widespread failure to adequately record the relevant data. A further contributory factor, particularly as concerns the Mesolithic, stems from a problem that Childe himself did not explicitly consider. The above points are supported by a brief review of the literature. Following on from this, it is suggested that an important task for the future is the objective isolation of archaeological types, so that a cultural framework can be established. One aspect of this could be the use of typelists for flint artifacts. The recovery from surface fieldwork of virtually nothing relating to the Neolithic other than worked flints, would argue that greater emphasis could profitably be placed on these artifacts as cultural indicators, and perhaps less on pottery.

M. W. Pitts

Hellenistic and Roman Cnidus with Special Reference to Domestic Sites

The history of Hellenistic and Roman Cnidus has been reassessed and as far as is yet possible has been related to the excavated sites. It has also been shown how power in Cnidus, following the general trend in the Greek world, changed from one man to an oligarchy and then to a democracy in the 4th century BC. Finally all power was vested in Rome even though the city itself remained free. The geographical background to the Cnidus peninsula and the agriculture of the area has also been discussed briefly. An account then follows of the topography of the city itself which tries to show how the 4th century city was laid out with a 'Hippodamian' grid both on the mainland and on the 'Island' at Cnidus. The various buildings excavated by the Dilettanti in c.1812 and Sir Charles Newton in the late 1850's are then re-examined and compared with those from the recent excavations which began in 1967. Finally the few Hellenistic and Roman houses that have been excavated are briefly described with particular mention being made of the extremely fine Hellenistic stucco and wallplaster which was found in one of them. Due to the particularly well-preserved nature of these Hellenistic buildings, a hypothetical reconstruction has been possible.

T. W. T. Tatton-Brown

Roman Lead Coffins

Inhumations in lead coffins occur widely in 'Lowland' Britain with the majority concentrated around walled urban centres; the rest are mainly individual finds. The coffins are either rectangular (c.60%), or tapering from head to foot; three quarters at least were enclosed in outer wooden coffins, c.10% in stone outer coffins, and c.10% of all in some form of enclosing cist or mausoleum.

Orientation, constructional types and techniques, skeletal contents, mineral contents, analyses of lead, artefactual contents with regard to dating, and decorative elements and techniques are discussed in succession. There is also brief discussion of lead ossuaria, and lead tombs and other vessels of lead. Appendices comprise a gazetteer of finds and analyses of non decorative and decorative features for both coffins and ossuaria.

The main conclusions to be drawn from this compendium are that the widespread distribution corresponds with that of wealth, most instances with decoration and/or rich artefactual contents being from the Thames estuary area. Few, if any, date from the 2nd century or earlier. The silver content of the lead is low. There are more female inhumations than male. With the exclusion of those from Poundbury, there is still some evidence for a Christian orientation amongst the remainder.

Hugh Toller

Phallic Representations in Roman Britain

The Roman period in Britain saw a fairly vigorous tradition of phallic worship and veneration, fusing Roman 'Priapic' ideas with complex phallic cults of the indigenous Celts. The motives behind the veneration of the phallus appear to have varied greatly, but of particular importance was the supposed apotropaic powers of the phallus, or of the phallic gesture, the *fica* particularly where the phallus is 'demonised' by the addition of limbs or, commonly, wings.

The commonest phallic objects found in Britain are several types of bronze phallic pendant, these appear almost always in military contexts of the first and second centuries, although there is also evidence that they were suspended around the necks of children. Phalli are also commonly found on building stones, perhaps to secure success for the enterprise, and carved on free-standing stones, often in the form of a phallic head-on-pillar, in Celtic fashion. Primary phallic designs on pottery are rare in Britain (although notable from the Colchester kilns).

P. D. Turnbull

Zenobia – The Background to an Eastern Crisis

AD 259 was a year of crisis for the Roman Empire; the western provinces formed a separate empire, the Danube frontier was threatened by migrating tribes and a new, aggressive Persian dynasty had arisen in the East. Shapur I the Great King defeated and captured the Emperor Valerian and the east seemed certain to fall to Persia; it was saved by Odenathos, King of Palmyra, an affluent trading city in the Syrian desert. He defeated the Persians and pursued them as far as their capital, Ctesiphon, but was then diverted by an invasion of Goths into Cappadocia. Gallienus created him CORRECTOR TOTIUS ORIENTIS, giving him overall command in the east where he fought for Rome until 268 when he and his elder son were assassinated.

His young son succeeded him under the regency of his mother, Zenobia, but they were not granted the same honours as Odenathos. Snubbed by this and encouraged by the power which Odenathos had built up, Zenobia took advantage of Rome's troubles in the west to conquer all Asia Minor as far north as Bithynia and including Egypt. Aurelian (270–75) concluded an agreement with her, granting Vaballathos his father's honours and joint issues were struck for them both at Alexandria. In the spring of 272 Zenobia declared independence but was defeated by Aurelian twice at the battles of Antioch and Emessa and was captured herself whilst fleeing to Persia. There was a second rising both at Palmyra and Alexandria, leading to the destruction of Palmyra and the razing of Alexandria's fortifications.

Zenobia's ministers were executed whilst she appeared in Aurelian's triumph and was pensioned off at Tivoli. The fate of Vaballathos is not known. The events are dated from the Alexandrian coinage which bears the mark of the fiscal year and the regnal year of the Emperor.

Susan Yeomans

Book Reviews

BRUCE-MITFORD, Rupert, ed. *Recent archaeological excavations in Europe*. London, Routledge & Kegan Paul, 1975. xxvii + 335 pp., 113 figs., 46 plates. £12.00.

This new volume on recent archaeological work in Europe can be seen as a companion volume to *Recent archaeological excavations in Britain*, published 20 years ago by the same publisher and with the same editor. Like its predecessor, the new volume is beautifully produced and, moreover, fully reflects the advances in printing and reproduction made during the time elapsed. As must be expected, however, the range of this new book is in comparison vast. It includes articles on excavations as widely separated in time as the Hungarian Palaeolithic and the Medieval port of Bergen; and in space as Russia and the Thames Valley.

The selection of 11 (originally 12) contributions on recent work throughout Europe must have presented an extremely difficult task, as the editor himself stresses. A pattern of a kind seems to emerge. Geographically, the accent is on north and east Europe, with only one contribution from France, on the Celtic oppidum of Entremont, near Aix-en-Provence; and nothing at all from Spain or Italy. Chronologically, the choice has fallen on the historic and protohistoric rather than the prehistoric, though there is no recognisable order in the arrangement of contributions. The book begins with the great 9th century Moravian stronghold of Mikulčice and its ten churches, and ends with an account of the Medieval fortress on an island in Lake Lednica – both in eastern Europe.

Despite the title, not all the excavations described are particularly recent (though several which began in the 1950's are still continuing) and in one case at least the excavator has since died. One must therefore consider the value of the work in terms of the importance of individual sites or the inaccessibility of existing accounts of their excavation. Prehistorians may be disappointed, since only two contributions can be said to deal with true prehistory. The Lower Palaeolithic site of Vértesszöllös (Hungary) has already been reported in English, but the text revised by Gale Sieveking with improved illustrations make it of value. The fascinating account of the Bandkeramik village, with its cemetery, at Elsloo (Netherlands) was presented to a London audience a few years ago by the excavator, Pieter Modderman, and it is good to have this account of his work in English. Prehistoric material is described in the (mainly Anglo-Saxon) crop-mark site currently being excavated by strikingly successful methods at Mucking in the Thames Valley, and also in an extremely valuable summary of recent discoveries covering all periods in European Russia – though not all these are new to English readers (thanks largely to books by Professor Sulimirski and others).

Perhaps the most satisfying contribution, especially for those to whom reading German does not come easily, is the account of 23 years' work at the great citadel of the Heuneburg on the Upper Danube, excavated by Kurt Bittel and Egon Gersbach, and ably summarised and placed in its wider context by Professor Wolfgang Kimmig. This enormously important excavation includes the discovery of the earliest clay-brick walling in Europe and has provided a wealth of material that has added much to our knowledge of the Hallstatt and La Tène inhabitants of this part of the world, including the former's predilection for chicken!

Finally, it should perhaps be asked when considering such a book whether the multi-period, multi-region approach is valid in these days of rising costs on the one hand and increasing specialisation on the other, and who apart from libraries can afford it? The specialist will not find enough on any given period or region to warrant the expenditure of £12.00, while the non-specialist (alas, a dying breed?) is likely to consider it a luxury. Were it perhaps planned as the first of a *series* of such volumes (hopefully at a lower price) so that a corpus of information on all periods throughout the area would in the end result, then this lavishly illustrated and impeccably produced book might have a wider market and more *raison-d'être* for the future. Nevertheless, it does provide an up-to-date and easily accessible collection of important excavation accounts which would probably not otherwise become available in English for a very long time – if ever.

PATRICIA M. CHRISTIE

BOOK REVIEWS

WOOD, Eric S., *Collins Field Guide to Archaeology in Britain*. London, Collins, 1975. 4th edition, 384 pp., 32 plates, 38 figs., 5 tables, 18 maps. £3.50.

It is always intriguing for a reviewer to work through a book which claims in its preface to be 'quite extensively revised' (p.18). The extent of the revision is, in fact, as follows: the 1972 text has been lengthened by about 50 lines, and another 40 have been altered. The additions include half a page on 'Rescue', which is, however, not indexed. The section on 'Watchmen's Huts' (1972 edition, p.252) reappears as 'Body Snatching' on p.166 of the 1975 edition, but the index remains unamended.

In a number of examples the text indicates that no revision has taken place for many years.

p.64: 'recent research ... (in December 1960)'. Comment: is this recent?

p.140: 'Excavations of the last few years'. Comment: this refers to Stonehenge, and the 1954 dig.

p.140: 'Mr (now Professor) Atkinson'. Comment: he's only been 'Professor' for the last eighteen years, since 1958!

p.305: 'Monthly programmes on the wireless, "The Archaeologist".' Comment: last broadcast in ... who remembers when?

This overall lack of revision can be seen from the following examples, taken from the Palaeolithic period. Milankovitch is no longer the last word in Pleistocene chronology. Zenner's *Dating the Past* (1958) is still an important work, but reference might have been made to Sparks and West: *The Ice Age in Britain* (1972). These authors use British glacial nomenclature, not the Alpine ones which Wood claims are still in current use. (All these points refer to p.35.) Most workers now classify Neanderthal man as a subspecies of *Homo sapiens*, but the text on pp.44, 54 does not take this into account. Finally, despite the excavations of Desmond and Ann Collins (published 1970, in an earlier *Institute Bulletin*) Oldbury, Kent, is *still* classified as a living site of the Mousterian period on pp.47, 97.

While the above examples show that much of the text has not been revised at all, other examples show what may be more misleading; that is, patchy revision. This is nowhere more clear than in the chronology of the British Neolithic:

'c3000-1800 in Britain' (p.20); 'the coming of the neolithic farmers late in the fifth millennium' (p.23); on page 35 a typographical error (inherited from previous edition(s)) puts the neolithic contemporary with the 'Atlantic' climatic zone, beginning '3500 BC'; 'by 4000' (table 3, p.51); 'c4000-2400 BC' (p.52); 'late in the fifth millennium (say 4300-4000) families began to land' (p.53); Windmill Hill 'dated by carbon 14 ... 400-500 years later than the first settlements' (p.54: which puts the beginning of the neolithic c3000); 'c4300-c2400' (table 4, p.70); '4000-2400' (p.85). No further comment by the reviewer is necessary.

It is impossible to recommend a book which claims to be 'extensively revised' yet which still talks of Beakers and the Iron Age in ABC terms, refers to 'Secondary Neolithic' and 'Rinyo-Clacton' and uses Alpine glacial terminology. This is unfortunate because the preface rightly claims that 'the continuing demand for the book testifies to the general desire for basic information, with which public opinion can be strengthened in its struggle to counter the threats to our heritage' (p.18).

The final inexcusable deceit by the publishers is the dustjacket. Here are reprinted review extracts which were also on the previous edition. A prospective buyer is totally misled, for the book now falls far short of the praise of reviews of earlier editions. The reprinting of this book with minor, haphazard, changes under the guise of a revised edition is nothing short of scandalous.

DAVID WILLIAMS

DUNNETT, Rosalind, *The Trinovantes*. Duckworth, London, 1975. (Peoples of Roman Britain Series). 165 pp., 44 figs. £2.80.

One of the difficulties encountered by this series is that of boundaries, especially when the identity of the tribe under review is projected back into the Iron Age in the first chapter. Miss Dunnett solves this by basing her area on the distribution of the coins of Addedomarus, and revives Peacock's proposition that the Welwyn-type rich graves belong to the Trinovantes. Both of these, unfortunately, are rather shaky theories, especially the latter, since there are possible Welwyn-type graves to be found well across the other side of the Chilterns. This question of boundaries, of course, can never be satisfactorily answered; Miss Dunnett is in any case on much firmer ground once past the Roman conquest

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and able to present the material she knows at first hand from own excavations. It seems a shame that 'after the Boudiccan revolt there is no further historical reference to the Trinovantes' (p.51): the tribe comes to a brief and lurid prominence that is clearly outlined in a short narrative section, after which date we must go on assuming their existence as a political and social entity. They remained insignificant throughout the rest of the Roman period.

The book is useful as summary of existing knowledge, and no less important, the gaps in the knowledge and the reasons for them. Nor is there too much concentration on Colchester, which must be by its nature exceptional. She has clearly attempted to keep it up to date: Philip Crummy's recent work on the Balke Gate, for example, is included in the notes; and the notes are fairly full and helpful to the new student in following up source material. But while she observes the doubt there is about siting the *Durolytum* of the Antonine Itinerary at Romford, she persists in this identification; while others feel it is far more likely to have been the site at Chigwell. Almost nothing is known from Romford. She makes clear the general point of the rustic nature of even the larger settlements in Essex during the Roman period, but while public buildings may have been scarce, the *mansio* at Chelmsford surely qualifies. Despite the lack of sophistication in the towns, she notes the large number of known or probable villas; regarding the apparent dearth of them around Chelmsford, there are in fact at least three, at Broomfield, Chignal, and Chignal St. James.

She rightly emphasises the difficulties due to the lack of excavation, especially in assessing rural settlement, and makes a point of including field systems and not just villas in isolation.

The chapters on settlement and communications are fairly detailed; it is a pity that the standard lay-out for this series leaves not quite enough room at the end for the chapters on industry and economy, and the later Roman period.

ISOBEL THOMPSON

WEBSTER, Graham, *The Cornovii*. London, Duckworth, 1975. 154 pp., 46 figs. (Peoples of Roman Britain). £2.80.

What an excellent series of books Duckworth is producing! The latest by Dr Graham Webster, our white-haired doyen of West Midland archaeology, has followed impeccably the formula and standards laid down by the three other volumes (*The Regni* by Barry Cunliffe, *The Coritani* by Malcolm Todd and *The Trinovantes* by Rosalind Dunnett).

In contrast to these volumes, however, Dr Webster has had to deal, with appreciably less information, with the little-known and hitherto unfashionable Cornovii. But even with scant information he has managed to weave an interesting and comprehensive guide to the Cornovii, whose bare threads he has done so much himself to clothe.

The book opens with a chapter on the tribal territory and pre-Roman Iron Age, where a handful of hillforts and settlements seems to be giving us a picture of culture measurably lower than its contemporaries in south-east England, without coinage, distinctive metalworking, and above all, characteristic pottery. It is a pity that Webster has not seen fit to include an illustration of the renowned Wrekin, a spectacular hillfort some five miles from the later tribal centre at Viroconium (Wroxeter).

In the second chapter, history AD 43–367, Webster deals with 'his' subject – the early military activities and forts before the final settlement of Wales and Scotland under Agricola. This settlement meant the final abandonment of the legionary base at Wroxeter and the establishment of the civil settlement, whose first faltering steps at civil building received a severe set-back. In the second century, however, Wroxeter emerges as a city of some measure and the focal point of the Cornovian territory during the succeeding and often turbulent centuries.

The next chapter deals firstly with communications and then urban settlement, of which Wroxeter stands out pre-eminent among a few minor towns (Whitchurch, Wall, etc.). Even though only a small portion of Wroxeter's 180 acres has been excavated (and even less, methodically!) the open fields of Wroxeter hide beneath them one of the best archaeological sites in Britain, whose excavation will take hundreds of years. But, undeterred, Webster has been heard to say: '... and I don't mind doing it myself'.

After rather less detailed chapters on rural settlement and industry, and the economy, the author goes on to his last and perhaps most controversial chapter: the late 4th and 5th centuries, where, again,

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the information is too scant, too controversial, and in some cases too contradictory at present to come to any safe conclusion with regard to the end of Roman Wroxeter and the surrounding territory. Webster provides us with an interesting summary of Philip Barker's worthy and recurrently perennial excavations on the site of the Baths Basilica in the very heart of Wroxeter and therefore of the Cornovii itself. That Wroxeter ended 'not with a whimper, but a bang' (Barker, 1971, p.8) is surely of fundamental importance not only to our knowledge of the Cornovii, but to the other towns of Roman Britain.

In summary, Webster has produced a very worthwhile addition to the series, although handicapped by the meagre information (and therefore perhaps slightly inclined to padding). Hopefully he has provided us with a springboard for a full-scale archaeological assault on this marginal area of Roman Britain, perched precariously on the fringe of *Orbis Terrarum*.

CHARLES HILL

SWAN, Vivien G., *Pottery in Roman Britain*. Shire Archaeology, 1974. 56 pp., 34 plates, 14 figs. £1.00.

Romano-British pottery is a daunting subject to the non-specialist and as a general guide has long been required this booklet should be welcomed. Mrs Swan sets out to give an outline of the pottery forms and fabrics most widely found in Britain, and this she does admirably, in a summarised form, using the line drawing to illustrate some of the types. These drawings are well produced, although a map showing the industries mentioned would have been a valuable addition, and the selection of types for illustration is biased toward the fine wares. The plates are not very useful; they tend to be "flat" and are often redundant — perhaps put in to fit the publisher's format rather than the book? In spite of this some of the plates are useful, but one of the more interesting ones (pl.13) is reproduced at much too small a size.

What is attempted has succeeded, but from the point of view of a general introduction much is missing. Only short notes are given on kilns and the end of the industries whilst nothing is said of manufacturing techniques (and there are no references for this aspect). Also too little is said of how and why we study pottery, and what this study can tell us of trade and Roman Britain in general. Such chapters could well have replaced some of the plates and would have made the book of more value to student and general reader alike.

M. MILLETT

TIMMS, Peter, *Flint Implications of the Old Stone Age*. Shire Archaeology, 1974. 17 pp. text, bibliography, index, 32 pp. figs. Price 75p.

Apart from Reginald Smith's little *Flints* (British Museum, 1st ed. 1926) this booklet is the first free-standing publication devoted solely to a general review of British flint typology, to have appeared since the second edition of John Evans's *Ancient Stone Implements of Great Britain* (1897). However, the non-specialist (school?) audience being sought, together with the brief length of the title under review (and of this review note!) urges its consideration in the context of the Shire series, of which this is one offering, rather than of British stone implement and assemblage studies.

There are six chapters. Sections on 'The Clactonian', 'The Acheulian', 'The Middle Palaeolithic' and 'The Upper Palaeolithic' are preceded by an 'Introduction' and two pages about 'Man and his environment'. Line drawings comprise a diagrammatic representation of Glacial stages and related Palaeolithic industries, four maps showing the glacial frontier across Britain at various dates, and a number of flint drawings illustrating technological or typological points made in the text. The inclusion of one figure illustrating four Magdalenian bone harpoons reminds one that Mr Timms was faced with the situation that, unlike the subjects of the other booklets in this series, his artefacts are usually the major, and frequently the only source of information about the societies that produced them. *Flint Implements* is a readable (except for one or two odd phrases), neatly produced and fair introduction to Palaeolithic studies in Britain.

M. PITTS

BOOK REVIEWS

JESSUP, Ronald, *Anglo-Saxon Jewellery*. Shire Archaeology, 1974. 96 pp., 33 plates. £1.25.

This little book may be divided into two parts: the first comprises an introductory text of 37 pages, a list of relevant museums, select bibliography and a short table of comparative dates; the second consists of 21 pages of photographs with captions to accompany them. Unfortunately the publisher has adopted the practice of counting pages of illustration as text pages and has made the bibliographical confusion still worse by sometimes including a group of objects as one plate and elsewhere giving two objects on the same page different plate numbers.

It is a pity that no attempt is made to relate the two sections of the book, so that it is not possible to tell at a glance whether an object discussed in the introduction is also illustrated. The writer of this review especially regrets the absence of the King's School, Canterbury brooch (p.37), the Faversham bracelet (p.40) and above all the Snape ring (p.41) whose place is taken by inferior objects. Notes on the plates are clear but, in a book which will be used in schools, the absence of a metric scale will be a disadvantage. A few references would also be a help especially when unusual or controversial statements are made (e.g. pp.60, 62 'Another view is that the craftsman' who made the Saree brooch 'was trained in Kent and moved subsequently to Finland').

Jessup imparts a great deal of information and the author's erudition and enthusiasm are never lacking. A few of his attempts to make this fascinating subject 'relevant' to the *Chronicle*-watching public misfire (cf p.34 brooches 'may now perhaps be studied statistically and by matrix analysis ... but we do well to remind ourselves that each brooch could prick the finger of its owner'). However for the most part the faults of this book arise from the sort of haste and carelessness for which the publisher may be as much to blame as the author. A new, revised edition could set all this to rights.

M. HENIG

MUSSET, Lucien, *The Germanic Invasions, AD 400 to 600*. Elek Books, London 1975. pp. 283, 5 maps. £7.95.

This book is divided into two parts; the first 150 pages provide the straightforward historical narrative, the second part, consisting of 90 pages is called 'Unsolved problems and subjects for further research'. The English reviewer of this book, which was written by the professor of medieval history at the University of Caen, and very ably translated by Edward and Columba James, is at once in a privileged and a difficult position. This position becomes more difficult when he happens to be an archaeologist with historical tendencies, especially fond of the later Roman Empire.

For the first 90 pages the story of the continental migrations of the fourth and fifth centuries flows superbly along according to historical sources with such enthusiasm and attention to detail caught up in a masterful and compelling manner that it seems to be the final authoritative word on the period. Then the invaders of England make their appearance and the edifice crumbles. A first reaction was that it would be highly insular to allow a few slips in the mastery of the British sources to provoke bias against so masterly a handling of the continental evidence. But even good resolutions of open-mindedness could not heal the wounds made by the British slips, the wounds became infected, and a generally jaundiced view set in.

All must seem set for a quick coup de grâce, a regretful epithet on promise and performance, and the end of an unfavourable review. This is not to be, for several reasons, the main one of which is the fact that the author seems to make it quite clear throughout the book that he agrees with me. He emphasizes throughout the need for humility in the face of historical and archaeological difficulties, and he practices what he preaches. After the initial mastery of the early historical sources it therefore becomes obvious that he is profoundly dissatisfied with the state of present knowledge, but does not know what can be done about it. He suggests lines of enquiry which could be opened up, he makes suggestions for further research, and he makes a list of unsolved problems, but all these seem slightly disappointing and unreal. In theory he has few illusions about archaeology, but he does not carry his doubts far enough into practice to see that the basic problem which is causing the blockage is the present muddle between history and archaeology. This explains the unevenness of the book. While it is history, or the continental migrations or Later Roman Gaul or Italy a superb and beautifully consistent picture is projected. On the British side, where sources fail, and archaeology is known to be important he falls into the mixture and the picture flickers badly and fades. There is no point at which he deals

with archaeological material alone, so his mastery of this art is not called in question. He gives good reason to think that if he did embark on pure archaeology he would provide a very thoughtful essay for he tells us what archaeology has to do, and even how it must set about it. Objects must be understood in terms of chronological and geographical distribution (p.156). Quite rightly he sees that nothing less than a complete archaeological summary of the migration period throughout Europe will suffice. He does not follow this through to its conclusion and it may be worth attempting such a course to finish off this review.

In the historical field Musset's suggestions for further work and enumeration of unsolved problems cannot hope to fire the uninitiated archaeologist with enthusiasm. The suggestions are all for the crossing of t's and dotting of i's and his very success at historical synthesis acts against these suggestions. He has drawn a satisfying picture, why, one asks, tamper with the details.

His suggestions for a synthesis of material culture in Europe, 300 to 800 are compelling. obvious, gigantic, and out of fashion. Progress is said, at the moment, to come from detailed studies of limited material, and, especially in England, a wide view is synonymous with superficiality. But the justification of such ideas must be left in favour of a brief examination of the likely effect of such a survey if it were to be carried out. Firstly, it would not complement the historical picture, it would be a completely separate picture with its own rules of behaviour, criteria of definition and implications for synthesis. It is extremely unlikely that the historical terms would be appropriate to an objective survey of the material, and such a survey would not only not help the historical picture, it would positively react against it. Thus in England Bede and his invasions of Angles to one place, Saxons to another, and Jutes to another just does not square with the material and at present the material wins. When there is comparable detail available, say, in France, how much of the present historical picture will stand up?

Secondly, the survey of archaeological material will provide a corpus of material which will need to be set a totally different set of questions from those usually posed by historians to their written sources. Institutional and religious documents may have institutional and religious questions properly asked of them. A corpus of belt buckles cannot, of itself, answer any questions on institutions or religion. A new corpus will bring in a whole new set of questions, a whole new approach to the period of the migrations, and the fact that this is already implicit in the writings of a French historian is absolutely magnificent. Someone at the centre of things, in the way that Insular archaeologists and historians are not, nor, even with the Common Market, ever can be, has the ideas of the future and that must be the most heartening thing to come out of this uneven, splendid, provocative, and finally inspiring book.

R. M. REECE

HODDINOTT, R. F., *Bulgaria in Antiquity, an Archaeological Introduction*. London and Tonbridge, Ernest Benn Ltd. pp. 368., 105 figs., 202 plates, 2 maps. £7.50 net.

For many years archaeologists of the Graeco-Roman world, including not only the ancient centres of the Mediterranean but also lands on its fringes which were included within the Roman Empire for nearly half a millennium, have confidently employed such terms as Roman, Greek and native, to identify and classify a great variety of sites and objects. Much of the resulting analysis and synthesis has revolved around the interplay of these concepts, defined not only through historical criteria but also from the functional and artistic classification of artefacts. In recent times there has been a much greater attention paid to the various native identities. An important stage in this process was the publication of Rostovtzeff's *Social and Economic History of the Roman Empire* in 1926. In Britain one recalls especially the famous chapter (XV) of R. G. Collingwood's *Roman Britain* describing how the native British traditions in art were driven underground by the weight of mass-produced Roman imports, only to re-emerge triumphantly at the end of the Roman era. While notions of 'Romano-British' and 'Gallo-Roman' have long been familiar, more recently other national identities have been emerging, often with strong external stimulus, and sometimes as part of an attempt to authenticate a modern national identity. Certainly an increased attention to the remains of native cultures which had been absorbed within the classical world has served to correct the distortions in older studies where the Roman Empire was often approached through a small number of impressive urban ruins.

Even if, like a recently published volume labelled 'Roman France', the title of Mr Hoddinott's new volume contains an element of historical incongruity there is no doubt that it offers a splendid introduction, the first to appear in English, to the archaeology of that part of south-east Europe which now lies within the modern state of Bulgaria. It contains detailed descriptions of all the major sites, many of which are little known and hitherto incompletely published, accompanied by more than two hundred illustrations and over one hundred plans all admirably redrawn. The material is arranged according to the three divisions of Greek, Roman and native, mentioned above, with fourteen chapters grouped under three historical headings, 1 Thracians and Greeks, 2 The Roman Presence and 3 Christianity and the Byzantine Withdrawal. The historical divisions between geographically arranged chapters can sometimes be confusing, particularly in the descriptions of major sites (for example Beroe pp.312–6) where the earlier and later phases in the history of a complex structure are described in different parts of the book. There is a useful bibliography (pp.346–52) listing the references for 64 sites, although accuracy in transcribing names might have been forgotten to make it clear that the I. Velkovo who wrote in *Germania* (p.350) is identical with I. Velkov mentioned in the text describing the remarkable site at Golemano Kale (pp.256–8) in northwest Bulgaria, which was identified as a settlement of Gothic foederati made under Justinian in the sixth century. Among the many items registered in the bibliography perhaps space might have been found for some older items published outside Bulgaria, such as Ernst Kalinka, *Antike Denkmäler in Bulgarien* (Vienna 1906), Hermann Vetters, *Dacia Ripensis*, with Rudolf Egger on the remarkable Čekančevo inscription (Vienna 1950). Appropriate tribute is paid to the work of older scholars, notably the Czech brothers H. and K. Škorpil who arrived in the nineteenth century to rescue the heritage of the newly liberated Bulgaria from half a millennium of Turkish rule. The two maps are adequate but with a larger scale could have been more detailed to serve the text, while that for the Roman period would have been more useful if the Augustan and Diocletianic provincial boundaries had been indicated. It might also have been helpful to the reader if there was included a map showing the linguistic boundary between Latin and Greek based on the evidence of inscriptions, first traced in detail by K. Jireček in the last century and which crosses modern Bulgaria from southwest to northeast (conveniently available in H. I. Marrou, *A History of Education in Antiquity*, English edition, London 1956, p.256). Such points of detail and presentation in no way diminish the admiration and gratitude for this splendid pioneering study, based on personal reconnaissance and careful sifting of the secondary literature which varies enormously in quality and utility.

As elsewhere around the Black Sea, the coast of Bulgaria received Greek colonies during the earliest wave of Greek expansion, Odessos and Apollonia Pontica from Ionian Miletus in the seventh and sixth centuries BC and Mesembria Pontica from Megara early in the fifth. More evidence is still needed about the early phases of these settlements as trading posts which developed a wider political role only with the ascendancy of Athens in the fifth and fourth centuries BC, a situation clearly reflected by the large quantities of Attic pottery of the period. Later the Macedonian and Celtic hegemonies were followed by the emergence of local Thracian powers, exemplified by the Sadalas whose tribute from Mesembria is euphemistically described in the surviving treaty as a gold wreath awarded in the course of the Dionysiac festival to 'a benefactor of the city' (p.48). Later the cities fell under the rule of the Dacian Burebista in the middle of the first century BC, after which Roman 'alliance' may have been at the very least a lesser evil. From the shadow of the Greek colonies, with their Greek imports and fine tombstones, emerge slowly the Thracian peoples of the interior. They remain known almost entirely through their tombs (pp.57–80), of the sixth and fifth centuries BC at Dolno Sahrane, Douvali, Mezek, and, of the fourth century, at Vratska. Remarkable for their stone chambers, expensive imported vessels and abundant gold, the tombs really tell us little about the Thracians and their society until Macedonian expansion in the second half of the fourth century brings them fully within the orbit of the Hellenistic world. The new colonization marked by the settlement at Philippopolis in 340 BC can still be contrasted with the extraordinary treasure from Panagyurishte, baroque in its excess of richness (or as Hoddinott p.90: 'rupturing the boundaries of taste'), which was probably concealed by a wealthy Thracian when the Celts were threatening in the early third century BC. The remarkable planned city of Seuthes (pp.92–7) discovered by rescue excavations after the Second World War, but as yet not fully published, can now be connected with the famous painted tombs at Kazanluk (pp.101–2) discovered a few years previously. These and other discoveries reveal a fascinating period of change and, one feels, a mixed society which demands a more subtle understanding than may be suggested by the emergence of a new discipline of 'Thracology' through established institutes and specialist colloquia.

The Roman and early Byzantine periods are richer in the quantity of remains but their general interpretation is less uncertain. The tide of imperial history swept back and forth across the Roman provinces of Thrace and Moesia Inferior and what remains for the Bulgarian archaeologist is the elucidation of problematical sites and objects within that framework. Thus the recently excavated defences at Iatrus (pp.133–5, where reference might perhaps have been made to the work of the German scholar K. Wachtel, reported to Roman Frontier Studies Congresses) and those at Abritus (pp. 157–8), dating from the early fourth century, can be matched with others known at Municipium Tropaeensium (Adamclisi) and Capidava across the modern frontier in Romania (p.134). Along with other military posts the establishment of legionary fortresses led to the development of large civilian settlements at Ratiaraia (pp.111–2), Oescus (pp.116–26) and Novae (pp.128–33). The separate evolution of legionary fortress, adjacent civilian settlement and formally constituted city, in the vicinity but at a prescribed distance from the military fortress, has now been understood at Aquincum and Carnuntum in Pannonia higher up the Danube (see András Mócsy, *Pannonia and Upper Moesia*, London 1974, p.127), and one suspects that one day it will be possible to recognise a similar pattern of development in the bases along the lower Danube in Bulgaria. South of the Danube frontier some indication of the riches in store for future excavators is given by the remarkable aerial photograph of the city Nicopolis ad Istrum (p.144, plate 94).

South of the Balkan mountains in the province of Thrace one is especially grateful to have the remains of Roman Serdica beneath the modern capital Sofia systematically described. Like Sirmium to the northwest the ruins of substantial buildings in Serdica from the time in the fourth century AD when it was an imperial residence have proved difficult to interpret. This is especially true for the large 'St. George' complex (p.173) to the east of the forum. Suggested identifications as bath-houses or martyr shrine are discarded by Hoddinott, whose own suggestion that it was an imperial reception hall of the Constantine period (p.174) seems to be supported also by a similarity in plan with some of the imperial rooms in Diocletian's Palace at Split.

For many years to come this splendid survey will serve as an aid for understanding new discoveries which are certain to be made in the future. Not only will it be of great help to many who have hitherto found it difficult to obtain comparative evidence to set alongside discoveries in other parts of the ancient world, but one hopes that its balanced perspective (described on p.19 as 'the twelve hundred years from the country's "discovery" from Greek colonists about 600 BC until its conquest and settlement by the Slavs') will also encourage Bulgarian scholars to retain a similar breadth of approach in the many rescue excavations necessitated by the rapid development of modern Bulgaria.

J. J. WILKES

MAASKANT-KLEIBRINK, Marianne, *Classifications of Ancient Engraved Gems. A Study based on the Collection in the Royal Coin Cabinet, The Hague, with a history of that Collection*. Leiden Boerhaavezaal, 1975. 267 pp. including 17 illustrations. Price not stated.

The work under review is a doctoral dissertation which describes 387 intagli in the *Haagse Penningkabinet* and uses them to show the course of stylistic development in the glyptic arts. There are relatively few gems dating before late-Etruscan times in the Collection and, in any case, Minoan, Mycenaean, Greek and early Etruscan gems have already been well studied by John Boardman and others. It is in her treatment of 'Roman' Republican and Imperial gems that Maaskant-Kleibrink comes into her own, interpreting the changing fashions of gem-cutting with skill and sympathy according to the various ways in which the drill was used.

The author never makes the mistake of confusing styles with individual workshops for, unlike Sena Chiesa or Tudor,¹ her material does not all derive from specific areas but is unprovenanced. Unlike some other writers she does not necessarily equate simplified cutting with the Late Empire (p.89); indeed she recognises that there was a rapid decline in ringstone production in the third century (p.227). Throughout her judgements are sensible and, in the best traditions of archaeology, regarded as provisional. She is 'aware that after a careful study of gems from dated finds it will be possible to streamline the proposed classification and, eventually, to group the gems by workshop ...' (p.46). The only error of fact which the reviewer has noted is that Jaspers are fairly scarce in the Northern provinces. This is certainly not true of Britain, where there is even evidence that they were cut in local workshops.

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The introductory chapter deserves to be read, even by those with little interest in Roman jewellery. The Royal Collection was accumulated in the eighteenth and nineteenth centuries from earlier *dactylothecae*, notably those of the erudite but credulous Jacob de Wilde (1645–1721), the eighteenth-century diplomat and adventurer Thoms (1696–1746) who was equally uncritical and was especially proud of a contemporary forgery of Augustus' supposed signet-ring. And Frans Hemsterhuis (1721–1790) to whom it was more important to have a stone depicting an edifying story than a genuine antiquity (p.17 fig.4): a typical philosophy. These attitudes to the past were not confined to the Netherlands but were a European phenomenon.

Few of the gems discussed here are illustrated (nor are the pieces selected indicated in the text). This is a pity as the book should be widely used. Fortunately Dr Maaskant-Kleibrink promises a full catalogue of the collection in the near future, an event to which the writer looks forward with impatience and avidity.

M. HENIG

1. G. Sena Chiesa, *Gemme del Museo Nazionale di Aquileia*, Aquileia 1966. D. Tudor, *Pietre Gravate descoverite La Romula, Apulum VI*, 1967, 209–229.

RHODES, D. E., *Dennis of Etruria*. London, Cecil and Amelia Woolf, 1973. 181 pp., 12 plates. £4.95.

Cities and Cemeteries of Etruria is one of those books which has eclipsed its author and taken on its own independent life. How many of those who have enjoyed dipping into it at one time or another have felt any curiosity about the author and how he came to produce his remarkable work? Evidently not many, since this is the first biography of George Dennis to be published, and he was even overlooked by the *Dictionary of National Biography*. Yet the man was fully as remarkable as his best-known work, and we are indebted to Dennis Rhodes for the painstaking research which has enabled him to give us this full-length portrait of an almost forgotten Victorian worthy, comparable with many other distinguished travellers and archaeologists of his time, and a figure of some importance in the development of Classical Archaeology in the 19th century.

Born in 1814, the fourth son of an official of the Excise Office, he was destined for a similarly unexciting, if eminently respectable career, by his father, who got him a post in his own office at the age of fifteen. A born traveller and writer, Dennis was first drawn to Spain, which he visited on leave from the Excise Office, and on which he published in 1839 (anonymously) his first book, called *A Summer in Andalusia*, which was well received. This was followed by a series of articles on the great Spanish hero, the Cid, founded on the celebration of him in early Spanish poetry, which also were eventually published in book form. It was only gradually that he moved towards Etruria and archaeology, but finally in 1842, at the age of 28, he set off with an artist friend, Samuel Ainsley, on his first tour of that region, and continued his visits, with Ainsley or alone, for the next five years, gradually accumulating the materials for his great book, which was eventually published by John Murray in 1848, when he was 34.

In a sense the rest of Dennis' long life – he did not die until 1898, at the age of 85 – is an anticlimax, though it was full of varied activity, which included, in his later years, much archaeological work in various Mediterranean countries. One reason for this is that the next fifteen years of his life were spent, apart from leaves, entirely in British Guiana in the service of the Colonial Office. Thus from 35 to 50 he was effectively barred from the fields of scholarship in which he had made such a brilliant debut. Symbolic of this hiatus is his work on Murray's *Handbook for Travellers in Sicily*, which began immediately after the termination of *Cities and Cemeteries*, but was only completed in 1864 just after he had left the Colonial Service, as the result of a long-hoped for transfer to the Consular Service.

This brought about his return to the Mediterranean, and for the next twenty-five years he held Consular posts in Sicily, Libya, Crete and Turkey, at the same time being employed by the Trustees of the British Museum to prospect for and excavate archaeological sites. Yet still the sense of anticlimax continues. It is impossible not to feel that he had taken a wrong turning in henceforth devoting himself chiefly, as an archaeologist, to the discovery and rifling of tombs and monumental buildings in pursuit of art objects for museums and collectors. It was, of course, what most contemporary archaeologists were also doing, but it was a form of activity which allowed little scope for his real gifts. The

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qualities which had made the success of the *Cities and Cemeteries*, apart from its erudition and accuracy, were essentially those of the topographer and descriptive writer. It is the feeling for landscape, ancient and modern, which comes over most vividly from those volumes, and constitutes their perennial charm. Had he chosen to employ the same approach in the lands to which his consular duties took him he might have given us some equally delightful companion volumes. The objects with which he enriched the collections of the British Museum are in many ways a poor consolation for the literary barrenness of those later years. The only important production of this time was the revised and enlarged edition of the *Cities and Cemeteries* which appeared in 1878.

Yet Dennis remained a lively and interesting person to the last, and Dr Rhodes' book gives us a fascinating picture of the restless old man, who at 72 had 'no intention of hanging up my shovel and my hoe', and whom Flinders Petrie, then 3, met in Rome a few years later and described as a 'delightful old fellow with bushy white hair, saying he felt as much a boy as ever'. The picture of Dennis which is built up, largely by extensive quotations from letters, chiefly his own, in the volume, is a many-sided one which gives us glimpses of many facts of 19th century life, while at the same time demonstrating the broad range of Dennis' own interests and sympathies. Education in British Guiana, the state of Sicilian prisons, Garibaldi, and many other subjects feature as prominently as archaeology. The book fills a real gap, and introduces us for the first time to a full man, and one well worth getting to know, as well as to the author of an early archaeological classic.

J. D. EVANS

KAPEL, H., *Atlas of the Stone-Age Cultures of Qatar*. Aarhus University Press, Denmark, 1967. 84 pp. of text, 71 plates, maps and drawings. Danish Kr. 103.50.

Published in English and Arabic (42 pages of text each; bi-lingual plate captions), this book is evidently now available in paperback. It represents Volume 1 of 'Reports of the Danish Archaeological Expedition to the Arabian Gulf', edited by Professors Glob and Bibby. Volume 2 has recently appeared. These works describe the results of research carried out in eastern Arabia by members of the Aarhus Museum team, preliminary reports of which have appeared in *Kuml* since 1954.

The 'Atlas' is so called because in it Kapel presents the working results of his research in Qatar, and does not see it as the definitive report; it consists of the indispensable basic data – an inventory of 122 sites containing flint artefacts which were found on surveys between 1956 and 1964, giving brief descriptions of finds and findspots. The former consisted of 30,000 registered specimens. In addition the finds are exceptionally well illustrated (17 photographs – 3 in colour – and 40 line drawings of artefacts). The drawings are of uneven quality, the type of retouch not being evident, but the main features are successfully brought out by use of profiles and cross-sections. There are also five topographic photographs (some in the Arabic section).

The remarkable richness of Stone-Age material in the Qatar peninsula and the large sample the surveys produced from its c. 500 square miles, allow some preliminary conclusions. These are presented in a few pages of text and by means of several site distribution maps showing the four cultural groupings into which the material can be divided. These are: the A group, which could be Lower or Middle Paleolithic, the B group or blade-arrowhead culture (C.14 dated at one excavated site to c. 5000 BC); the C group or scraper culture, which is undated; the D group, which has bifacial tools and tanged-and-barbed arrowheads distinguished by pressure-flaked retouch.

Further work in Qatar will no doubt add details or will necessitate modifications to this model. Indeed, the excavations of de Cardi in Qatar (as well as those of Masri in Saudi Arabia and Roaf in Bahrain) have shown the complexity of the D-group, which appears to have typological connections to tell-like sites having in some levels pottery of Ubaid type, C.14 dated to the 4th–5th millennia.

Interpretation aside, Kapel's sound research base and competent presentation in this volume provide a most useful framework within which Qatar's prehistory can be studied. All concerned are to be commended for the prompt publication of the 'Atlas'.

L. COPELAND

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LAUER, J.-Ph., *Saqqara, the Royal Cemetery of Memphis: excavations and discoveries since 1850*. London: Thames & Hudson, 1976. 248 pp., 175 plates, 20 colour, 14 text figs., map. £7.50.

M. Lauer has been associated for over forty years with excavations at Saqqara, and is especially renowned for his restoration of the Step Pyramid complex of King Zoser, on which he has written the standard work. Although the purpose of the present book is avowedly to promote interest in the site on the part of tourists, the treatment is thoroughly documented, and forms a useful synopsis of work done there since 1850, when Auguste Mariette, the founder of the Egyptian Antiquities Service, began excavating.

The chapters describe in roughly chronological order discoveries at Saqqara up to the present time. Most attention is naturally given to the pyramids and particularly to the author's special interest, the monument of Zoser. W. B. Emery's discovery of the First Dynasty royal necropolis is also discussed together with his subsequent search for the tomb of Zoser's architect Imhotep and the incidental find of extensive underground galleries containing animal cult-burials. There is a brief interim report on G. T. Martin's excavation of the unfinished Memphite tomb of Horemheb, dating to before his accession to the throne. The relative isolation chronologically of this last item emphasises how little has yet been recovered of New Kingdom architecture from the site.

The book is well produced, and the text, in English (no mention being made of translation), is clear and informative with a good bibliography. Although the photographic plates are admirable for the most part, a few showing reliefs from *mastabas* are rather over-reduced, and frustrating to use with the detailed commentary. Improvement in this respect might, however, have been achieved only at prohibitive expense. As it is, this is a valuable first-hand account by a scholar who played a significant part in much of the work described.

H. M. STEWART

HUGOT, H. J., *Le Sahara avant le desert*. Editions 'des Hesperides', Toulouse, 1974. 343 pp. FF.84.10.

'The organisation of villages and the social conception of groups are aspects that French researchers must take into account if they are to go further than the traditional framework of their work too often based on typological inventories, and not enough on how the objects that they are classifying can be socially significant.

... It is necessary to think of typology in an interpretative perspective and no longer only in a descriptive one' (p.127).

This seems to have been the aim of Hugot's book, recreating the daily life and beliefs of the past populations of the Sahara. You read this book as you would read a novel of Mary Renault rebuilding the Greek myths. But perhaps more than in the above mentioned author, the underlying scientific facts are evident. But one regrets the lack of any bibliography. A book of this sort, addressed to the general public could do with at least a few general bibliographical titles for those who would like to know more about a specific point. The only existing bibliographic indications are those linked to the illustrations, mainly of rock art, and showing from where they have been taken.

After an introduction concerning the environmental factors in the Sahara, and the history of research conducted there (the Sahara being taken in a broad geographical sense as extending from the Atlantic shores to the Red Sea), Hugot devotes two chapters to the Palaeolithic and the Upper Palaeolithic, mainly the Aterian. One would be curious to know from where he got the dates for the Aterian: 20,000 to 7,000, while the dates generally accepted (Camps, 1973), suggest that the Aterian occurred from at least 35,000 BC to 15,000 BC.

As far as the Palaeolithic is concerned, one could regret that terms like 'Kafouen' are still being used, when the industry it was meant to represent is generally considered to be non-existent. Anthropological evidence in the form of 'Tchadantropus', can also be considered as dubious.

The next chapters deal mainly with the Neolithic, a few words being said on the Epipalaeolithic. The different Neolithic facies are quite well documented, but one would have liked a little more illustration of the pottery and stone tools. Then comes the presentation of rock-art and a chronological attempt to classify it. Hugot's interpretation of the horse drawn carts, in the 'equidian stage' of the rock paintings is interesting to compare and oppose to Maundy's (1952). The book ends with a discussion of the agriculture and domestication problems. Hugot (p.321) affirms that for him, there has

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not been any agriculture at all in the Sahara (one would like to have a definition of what he means by agriculture), but simply what he calls a 'proto-culture' or 'vegiculture' (this last term being used in a completely different sense from the one generally accepted). This point obviously can be seriously questioned. Impressions on pottery of cultivated Sorghum have been found at Adrar Bous, which have been dated to 2000 BC (Clark, 1971). Impressions of cultivated Millet have been found at Dhar Tichitt especially in the 5th/6th and 7th phases (Munson, 1971), Tichitt dates from mid second to mid first millennium BC.

A number of points can be raised in criticism of this book, and the purpose of the book is difficult to assess. If it is for a non-specialist reader, which must be supposed to be the case, the style of writing and the illustrations are appropriately attractive. Many will be fired by the passion underlying Hugot's descriptions of the Sahara and its past population.

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Clark, D. J. 1971. Evidence for agricultural origins in the Nile Valley. *Proc. Prehist. Soc.*, 37(2), 34-79.
Munson, P. 1971. The Tichitt tradition: a late prehistoric of the South-western Sahara. PhD Urbana Champaign Univ., Illinois, 393 pp.

F. HIVERNEL

HAMMOND, N., ed. *Mesoamerican Archaeology. New Approaches*. Proceedings of a symposium held at the University of Cambridge, 1972. London, Duckworth, 1974. 474 pp., illustrated. £10.

Some might argue that the title of this book is misleading, since a number of the contributors emphasise more traditional approaches to problems. Yet all the articles, which derive from a symposium held in Cambridge in 1972, show an awareness of the changing perspectives of archaeological research, and it must be stressed that the 'New Archaeology' cannot proceed without the basic information. Certainly the articles are as recent as publication permitted, while the breadth of their content makes it hard to find a more unifying theme.

The majority of the contributors write about the Maya - a bias that reflects the editor's own involvement in that area - and touch upon such diverse topics as calendar boards, the function of canals and the use of royal offspring for political alliances among the Late Classic Maya. Other areas are not neglected, however; the Olmecs and Teotihuacanos are both tackled in a stimulating manner by acknowledged experts in their fields, while Postclassic Mexico is also covered from an iconographic and ethnohistoric viewpoint.

Outstanding among the chapters are, perhaps, Grove's paper on the nature of the Olmec presence in Highland Mexico, Price's stimulating discussion on the use of ethnographic models as they refer, in this instance, to the *cargo* system in Mesoamerica, and Furst's scholarly treatment of Teotihuacan art and iconography. Nevertheless, the majority will be valuable to those who work in the respective fields whilst there is a great deal of stimulating material for the less specialised student.

The book will have a considerable impact, particularly within the Americas, and it is no disparagement to suggest that one of its more significant aspects is that it was produced on this side of the Atlantic. Hammond is to be congratulated both for his initiative in organising the symposium and for the assumption of editorial responsibility which has ensured the high quality of performance by the contributors.

D. C. PRING

BOOK REVIEWS

BOOKS RECEIVED

The following books have been received. The fact that they are listed here does not preclude their review in a later issue.

- ANTHONY, Ild. *Discovering regional archaeology: Wales*. Tring, Shire Publications, 1973. 80 pp., 16 plates, 40p.
- AVI-YONAH, Michael (ed.) *Encyclopaedia of archaeological excavations in the Holy Land*. Vol.I, A-D. London, Oxford University Press, 1976. 339 pp., illus. £8.50.
- BENDER, Barbara. *Farming in prehistory: from hunter-gatherer to food-producer*. London, John Baker, 1975. 268 pp., 36 figs., 5 photos. £5.50.
- BIBBY, T. G. *Preliminary survey in East Arabia 1968*. (Jutland Archaeological Society Publications, vol.XII) (Danish Archaeological Expedition to the Arabian Gulf, Report 2) Copenhagen, Danish Archaeological Society, 1973. 69 pp., 66 figs. Danish Kr. 91.25.
- BRAY, Warwick. *Everyday life of the Aztecs*. London, Batsford, 1968. 208 pp., 97 figs. £1.25.
- BROWNE, David M. *Principles and practice of modern archaeology*. London, Hodder and Stoughton, 1975. 262 pp., 24 figs., 10 plates. £1.50.
- CLASON, A. T. (ed.) *Archaeozoological studies*. Papers of the Archaeozoological Conference, 1974. Amsterdam, North-Holland Publishing Company, 1975. 477 pp., illus. Dfl.135.00.
- DYER, James. *Discovering archaeology in Denmark*. Aylesbury, Shire Publications, 1972. 88 pp., 31 plates. 40p.
- DYER, James. *Discovering regional archaeology: Eastern England*. Tring, Shire Publications, 1973. 72 pp., 29 plates. 40p.
- DYER, James & GRINSELL, Leslie. *Discovering regional archaeology: Wessex*. Tring, Shire Publications, 1971. 80 pp., illus. 40p.
- EFFENTERRE, Henri van. *La seconde fin du monde: Mycènes et la mort d'une civilisation*. Toulouse, Editions des Hesperides, 1974, 239 pp., illus. Price not stated.
- FINET, A. (ed.) *La voix de l'opposition en Mesopotamie*. Brussels, Institut des Hautes Etudes de Belgique, 1973. 214 pp. Price not stated.
- GODWIN, Sir Harry. *The history of the British flora: a factual basis for photogeography*. 2nd edn. Cambridge, Cambridge University Press, 1975. 541 pp., 178 figs., 48 tables, 28 plates. £30.00.
- GOODCHILD, R. G. *Libyan studies: select papers of the late R. C. Goodchild*, edited by Joyce Reynolds. London, Elek, 1976. 345 pp., 75 figs., 96 plates. £17.50.
- GOUGH, Michael. *The early Christians*. (Ancient Peoples and Places) London, Thames and Hudson, 1961. 268 pp., 38 figs., 81 plates. £2.50.
- GRINSELL, L. *Discovering regional archaeology: South-Western England*. Tring, Shire Publications, 1970. 64 pp., 28 plates. 40p.
- HANSEN, Ulla Lund. *Glas fra danske oldtidsfund*. Copenhagen, Nationalmuseet, 1973. 31 pp., illus. Price not stated.
- LIMBREY, S. *Soil science and archaeology*. London, Academic Press, 1975. 384 pp., 36 figs. £8.40.
- MACKIE, Euan W. *Dun Mor Vaul: an Iron Age broch on Tiree*. Glasgow, University of Glasgow Press, 1974. 235 pp., 23 figs., 14 plates. £6.50.
- MACQUEEN, J. G. *The Hittites and their contemporaries in Asia Minor*. London, Thames and Hudson, 1975. 206 pp., 63 figs., 68 plates. £7.50.
- MAJOR, J. K. *Fieldwork in industrial archaeology*. London, Batsford, 1975. 176 pp., 28 figs., 39 plates. £4.50.
- MARSDEN, B. M. *Discovering regional archaeology: North-Eastern England*. Tring, Shire Publications, 1971. 64 pp., 31 plates. 40p.
- MARSDEN, B. M. *Discovering regional archaeology: Central England*. Tring, Shire Publications, 1970. 64 pp., 28 plates. 40p.
- MARSDEN, B. M. *Discovering regional archaeology: North-Western England*. Tring, Shire Publications, 1971. 65 pp., 28 plates. 40p.
- MELLAART, James. *The Neolithic of the Near East*. London, Thames and Hudson, 1975. 300 pp., 164 figs. £6.50.
- NATIONAL MARITIME MUSEUM. *Problems in the conservation of water-logged wood: proceedings of a symposium at the National Maritime Museum, 5 and 6 October, 1973*, edited by W. A. Oddy. London, NMM, 1975. iii + 133 pp., 39 figs. 50p.

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- POPE, Maurice. The story of decipherment: from Egyptian hieroglyphic to Linear B. London, Thames and Hudson, 1975. 216 pp., 118 figs. £4.25.
- SAMMES, E. Discovering regional archaeology: South-Eastern England. Tring, Shire Publications, 1973. 80 pp., 27 plates. 40p.
- RAISTRICK, A. Industrial archaeology: an historical survey. London, Eyre Methuen, 1972. xiii + 314 pp., illus. £6.25.
- SCULLARD, H. H. The elephant in the Greek and Roman world. London, Thames and Hudson, 1974. 288 pp., 24 figs., 24 plates. £6.50.
- SJOVOLD, Thorleif. The Iron Age settlement of Arctic Norway: a study in the expansion of European Iron Age culture within the Arctic Circle. II. Late Iron Age (Merovingian and Viking periods). Oslo, Norwegian Universities Press, 1974. 292 pp., 22 figs., 76 plates. Price not stated.
- WAETZOLDT, Hartmut. Untersuchungen zur Neusumerischen Textilindustrie. Rome, Centro per le Antichità e la Storia dell'Arte del Vicino Oriente, 1972. 297 pp., illus. Price not stated.

Notes to Contributors

Papers on any aspect of archaeology may be considered for publication in the *Bulletin*. All contributions and related correspondence should be addressed to the Editor, Professor J. D. Evans, Institute of Archaeology, 31–34 Gordon Square, London WC1H 0PY. The following notes are provided as a guide to intending contributors in the preparation of their material.

1) *Typescripts* should not normally exceed 10,000 words in length. They should be typed on one side only of A4 size paper (approx. 30 cm. by 21 cm.), using double spacing and leaving wide margins (at least 4 cm. on the left). Two copies of the typescript should be submitted, the author retaining a third copy.

2) *Footnotes* should be avoided as far as possible. If any are judged to be absolutely necessary, they should be typed on a separate sheet, not at the foot of the page to which they refer.

3) *Bibliographical references* should follow the so-called Harvard system. The author's last name, date of publication and number of page should be given in brackets in the body of the text, e.g. (Sharma, 1973: 129), or, if the author's name has been cited, simply (1973: 129). Full references should be listed alphabetically according to authors' names at the end of the paper. Where the publication cited is a paper in a periodical the title of the journal should be underlined and abbreviated according to the *World List of Scientific Periodicals*.

e.g. Paper: Sharma, G. R. 1973. Mesolithic lake cultures in the Ganga valley, India. *P.P.S.*, 39: 129–146.

Book: Butzer, K. W. 1972. *Environment and Archaeology*. London: Methuen.

Article in Book: Bordes, F. 1973. On the chronology and contemporaneity of different palaeolithic cultures in France. *The Explanation of Culture Change: Models in Prehistory* (ed. Colin Renfrew). London: Duckworth.

4) *Line drawings, plans and maps* should be drawn in waterproof black ink on smooth white paper, card, or good quality tracing paper or film. Lettering should be neatly done, either by stencilling or using self-adhesive lettering such as Letraset or Presletta, which should be varnished with the spray recommended by the makers to prevent damage. All line illustrations should be at least twice the intended final size, and of a shape suitable for reduction to full page (17 cm. × 12 cm.) or half page (8 cm. × 12 cm.) size. Line illustrations should be referred to as *figures* and numbered in Arabic numerals. The number should be written on the originals in soft pencil, and should correspond to bracketed references in the text, e.g. (Fig. 3).

NOTES TO CONTRIBUTORS

5) *Photographs* should be printed on glossy paper and preferably be full plate or half plate size, depending on the subject and the intended final size. They should be referred to as *plates* and numbered in Roman numerals. The numbers should be written in soft pencil on the back in one corner, and correspond with bracketed references in the text, e.g. (Pl. IX).

6) *Tables* should be numbered in Arabic numerals, but separately from the line drawings.

7) *Captions* to all figures, plates and tables should be listed on a separate sheet, and should be kept as short as is consistent with clarity.

8) *Radiocarbon dates* should be cited uncalibrated, using the convention bp, bc, ad to show that this is so. If calibrated dates are also presented, the convention BP, BC, AD should be used. Standard deviation and laboratory code should always be given.

9) *Abstracts*: a brief résumé of about 100–150 words should be supplied with each contribution, and will be printed at the end of the text.

10) *Submission date*: articles should be received not later than 1st October for inclusion in the following year's *Bulletin*. Articles will not be accepted unless complete with all illustrations, captions, etc. Twenty-five offprints of each paper published will be supplied free to the author. Additional offprints may be purchased at cost price; estimates of cost can be obtained on application.

UNIVERSITY OF LONDON

INSTITUTE OF ARCHAEOLOGY

Thirty-second
ANNUAL REPORT

1 August 1974—31 July 1975

Published at the Institute
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1976

INSTITUTE OF ARCHAEOLOGY
COMMITTEE OF MANAGEMENT

- THE VICE-CHANCELLOR (Professor Sir Cyril Philips)
- THE CHAIRMAN OF CONVOCATION (Professor J.P. Quilliam)
- THE PRINCIPAL (Sir Douglas Logan)
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- The President of the Society of Antiquaries (or other representative) (Sir Mortimer Wheeler)

RECOGNISED OR APPOINTED TEACHERS IN COGNATE SUBJECTS, OR HEADS OF SCHOOLS OR INSTITUTES IN THE UNIVERSITY:-

- Dr. G.H. Bolsover (Director, School of Slavonic and East European Studies)
- Mr. J.G. Burton-Page (Reader in the Art and Archaeology of South Asia, School of Oriental and African Studies)
- Professor W.G. Chaloner (Professor of Botany, Birkbeck College)
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- Professor J. Lynch (Director, Institute of Latin-American Studies)
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Professor W. Watson (Professor of Chinese Art and Archaeology,
School of Oriental and African Studies)
Professor D.M. Wilson (Professor of Medieval Archaeology,
University College London)

TWO MEMBERS OF THE NON-PROFESSORIAL STAFF NOMINATED BY THE
NON-PROFESSORIAL STAFF THROUGH THE ACADEMIC BOARD:-

Mr. M.W.C. Hassall

Miss J.M. Sheldon

THE FOUR PROFESSORIAL HEADS OF DEPARTMENT OF THE INSTITUTE
OF ARCHAEOLOGY (*ex officio*):-

Professor G.W. Dimbleby*

Professor E.E.D.M. Oates*

Professor F.R. Hodson*

Professor J.J. Wilkes*

FIVE OTHER PERSONS:-

Dr. R.L.S. Bruce-Mitford (Keeper, Medieval and Later Antiquities,
British Museum)

Professor J.G.D. Clark* (Master, Peterhouse, Cambridge)

Mr. A.R. Dufty (Keeper of the Armoury, Tower of London)

Lord Fletcher, P.C.

(*One vacancy*)

Lord Fletcher acted as Chairman throughout the session.

* Members of the Financial Sub-Committee

REPORT OF THE DIRECTOR FOR THE SESSION 1974/75

GENERAL AND STAFF MATTERS

For the Institute, as for most Universities and University institutions throughout the country, this was not an easy year. Yet we can be thankful that we have not, in the end, been as badly affected by the difficult financial situation as at times seemed likely, and, as the following report will show, our level of activity has continued undiminished and has even increased in certain ways.

At the end of the Session Lord Fletcher retired from the Chairmanship of the Committee of Management, having served in that capacity since 1968. During this long and often difficult period, he kept up an unflagging interest in all our concerns, and his help and advice, most willingly given, were of great value to us on many occasions. We should like to take this opportunity of expressing our gratitude and appreciation of his services to the Institute, and our pleasure that he has agreed to continue as a member of the Committee.

The end of the Session saw the retirement of three members of staff, Miss I. Gedye, Miss B. Parker and Miss G.C. Talbot.

Ione Gedye has been in charge of the conservation aspect of the Institute's work from its creation in the early 1930s, and her going inevitably seems the end of an era. From its very modest beginnings at that time she has watched over and fostered the growth of the Institute's Conservation Department, taking a very personal interest in the progress and subsequent career of each individual student. She has seen it develop from a 'rudimentary workshop-laboratory', as it was described in a 1936 policy document, to the purpose-built and relatively well-equipped Department in our Gordon Square building which she now leaves. During that time she has done much to raise both standards and the status of her profession, and her ex-students are scattered, not only throughout the British Isles, but throughout most countries of the globe, many of them occupying key posts in their respective countries. Perhaps her greatest satisfaction will be the special brand of affection and loyalty which she has inspired in them, and which constitutes a kind of world-wide freemasonry between all those who have at one time come under her influence at the Institute. We wish her a long

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and happy retirement, and are glad to know that she will be continuing to act as Secretary of the U.K. group of the I.I.C. She is succeeded as head of the Conservation Department by Dr. Nigel Seeley, who joined the Department last year, and to whom we wish a happy and successful tenure of the post.

Although Barbara Parker has not been on the staff of the Institute's Department of Western Asiatic Archaeology for a comparably long period, her connections with the Institute also go back to its earliest days. She was one of the two first students to take the Diploma in Mesopotamian Archaeology in 1936. For 12 years she was the indispensable Baghdad Secretary/Librarian of the British School in Iraq, returning only in 1961 to a post as Lecturer in the Institute's Western Asiatic Department, where the breadth of her knowledge of ancient Mesopotamia, spanning both the linguistic evidence and the archaeological aspect, has been invaluable to the Department's teaching. While also wishing her a happy retirement, we are glad to know that we shall not be losing her services entirely, and that she will continue to teach on two days a week.

It was in 1947 that Gerry Talbot joined the Library staff as Library Clerk. She has been a familiar and well-loved figure here ever since, becoming Assistant Librarian in 1963, and finally Librarian in 1970 in succession to Joan du Plat Taylor, the first holder of that post. The spontaneous warmth and friendliness of Gerry's personality were all-pervading, and set the tone in the Library over the years. No user of its services was ever made to feel unwelcome, and she was prepared to take endless trouble over any matter, however small. Her help was always willingly extended to all who needed it, and by no means only in Library matters. She took a lively personal interest in everyone she came in contact with, and her constant cheerfulness had a tonic quality which could lighten the darkest day and made the most intractable problems and the most difficult situations seem less formidable. We shall miss her greatly, even though, as Secretary of the British School in Iraq, she will be visiting us once a week, and we hope that she will find great satisfaction and happiness in this and her many other activities. She is succeeded by Miss Heather Bell, Assistant Librarian since 1970, to whom we extend our best wishes for success in her new role.

A most welcome addition to our staff this year was Dr. J.J. Wilkes who took up his duties as Professor of the Archaeology of the Roman Provinces in October. We trust that he will find a congenial home in this branch of his original *alma mater*.

REPORT OF THE DIRECTOR FOR THE SESSION 1974/5

The Cultural Exchange Fellowship was held by Mr. Ivan Mirnik, Deputy Keeper of the Coin Cabinet of the Archaeological Institute of Zagreb, Yugoslavia. In the course of this work he registered for a Ph.D. in the Roman Department of the Institute.

Dr. Thomas completed the thesis on which he had been working when he came to us last year, and was awarded a Ph.D. of Liverpool University.

The following appointments were made:

Miss E.M. Jeffery and Miss S. Seright, Secretarial Assistants, from 9th September and 11th November respectively. We are glad to welcome them to the staff of the Institute.

The Institute continued to work in close co-operation with the Extra-Mural Department in teaching for courses leading to the University Extension Diploma. Several courses were held in the building and lecturers both here and elsewhere included members of staff and both past and present students of the Institute. Dr. Newcomer and Mr. Parr acted as External Examiners.

STUDENTS

STUDENT NUMBERS:

The total number of students registered during the session was 196*. Five were registered for Diplomas; 70 for Research Degrees (26 part-time); 34 for M.A. and M.Sc. Degrees; 63 for B.A. and B.Sc. Hons. Degrees and 24 for courses in Archaeological Conservation (4 part-time). In addition 56 Intercollegiate students and 7 Occasional students attended lectures and used the facilities of the Institute.

Thirteen students were awarded the B.A. Hons. Degree in Archaeology, ten in the Upper Second Class and three in the Lower Second. Two students were awarded the B.Sc. Hons. Degree in Archaeology, one in the First Class and one in the Upper Second.

* This figure excludes students who have been registered for more than four years. They were counted previously. Most are postgraduates and there are about 30 of them.

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Of the Higher Degree students, 21 were registered for the Ph.D. degree full-time and 14 part-time. Twenty-three were registered for the M.Phil full-time and 12 part-time. Ph.D.s were awarded to Mr. G.P. Diamond (Prehistoric Department) in December, 1974; Miss J.H. Pullar (Western Asia Department) in February, 1975; Miss D.C. Elliott (Western Asia Department) in May, 1975; Mr. P.T. Craddock (Conservation Department) in June, 1975; Mr. D.S. Noble (Western Asia Department) in June, 1975; Mr. W.W. Phelps (Prehistoric Department) in July, 1975. An M.Phil. was awarded to Miss E.M. Holt in November, 1974.

Thirteen students were awarded the M.A. degree and one the M.Sc.

Eight students qualified for the Institute's Diploma in Conservation (two with a Mark of Distinction).

STUDENTS' UNION

During the session the officers of the Union were:

April 1974 - March 1975

PRESIDENT:	Nicholas Balaam
SECRETARY:	Alison C. Abbey
TREASURER:	Hugh S. Toller

April 1975 - March 1976

PRESIDENT:	Amanda J. Saunders
SECRETARY:	Ian Ferris
TREASURER:	Robin G. Densem

The President and student representatives attended all Academic Board meetings and Common Room Committee meetings. It is hoped to make student representatives full members of the Academic Board and of the Committee of Management.

REPORT OF THE DIRECTOR FOR THE SESSION 1974/75

Several Union general meetings and one Annual General meeting were held during the year. The average attendance was 34, a high percentage (16%) for a college Union in London. In the Presidential election for the year 1975-76, 41% of students voted.

A Union representative was sent to the N.U.S. Conference at Llandudno at Easter.

Several meetings were held to discuss the Council for British Archaeology's proposal to create a Professional Institution for archaeologists. The Director of the C.B.A., Henry Cleere, and Tom Hassall, from the C.B.A. steering committee attended one of these. As a result of these meetings a paper was drawn up outlining the views of some of those who had attended. The paper was signed by those members of the Institute (staff and students) who agreed with the sentiments expressed and then it was sent to the C.B.A. steering committee.

A series of seminars on Medieval Towns was organized by Tim Tatton-Brown and Julian Munby. The speakers and towns were:

John Morris	London
Alan Carter	Norwich
Lawrence Keen	Southampton
Peter Addyman	York
Richard Reece	Cirencester
Tom Hassall	Oxford
Derek Keene	Winchester

Coach trips continued, with excursions to Dorchester and Avebury; Portchester, Chichester and Fishbourne; Richborough, Deal and Dover; Winchelsea, Pevensey and Lewes.

Five parties were held during the year, including a Freshers' party at the beginning of the year and a garden party in July. Two parties during the training dig in Sussex at Easter were also subsidised.

On the sports side, a football team was set up which played in an intercollegiate league. The croquet set was popular in the Summer Term in spite of the increase in numbers

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of people in the Square. An inter-departmental darts match was played, the Romanists being victorious. The dormant Underwater Research Group was revived by some of the students and it is hoped that the presence of this group will encourage interest in this field of archaeology in the Institute.

The University of London Archaeological Society, run by members of the Union, arranged several interesting lectures during the year.

GORDON CHILDE PRIZE AND BEQUEST FUND

No Gordon Childe Prize was awarded for 1974/75.

Awards from the Gordon Childe Bequest Fund were made to Dr. I.C. Glover (Prehistoric Department), Mr. P.J. Parr (Western Asiatic Department), Miss E. Pye (Conservation Department) and Professor J.J. Wilkes (Department of the Archaeology of the Roman Provinces). Students who received awards were Miss M. Barnes and Mr. R.J. Watt (Human Environment Department), Mr. H.A. Hawkes (Western Asiatic Department) and Mrs. F. Hivernel (Prehistoric Department).

MARGARY FUND

Four students received awards to enable them to travel to Austria, Denmark, Iran and Jordan.

The BRYAN CLAUSON PRIZE

The Prize for 1975 was awarded to H.S. Toller

W.F. GRIMES PRIZE

The Prize for 1975 was awarded to M.G. Bell

REPORT OF THE DIRECTOR FOR THE SESSION 1974/75

TRAINING AND RESEARCH

SUSSEX ARCHAEOLOGICAL FIELD UNIT

The Unit once again provided the Easter Field Course for first year students, and many Institute students also took part in its other activities, including directing some of its excavations. A fuller report of SAFU's activities during the year is given below, page 32.

ARCHAEOLOGICAL/ENVIRONMENTAL FIELD EXCURSIONS

For a number of reasons, including expense, and the increasing difficulty of arranging suitable accommodation, the form of this Field Course was changed this year. Instead of a week's residential course, several day excursions were arranged. Two of them took place at the beginning of the academic year, with the intention that students should be introduced to the principles in the field as soon as possible, while at the same time being provided with an opportunity of meeting each other and members of staff out of the classroom and under informal conditions. There were three excursions in all during the year:

- I The environment and prehistoric monuments near Avebury.
- II The Roman and earlier sites at St. Albans and Ivinghoe Beacon.
- III The ecology of woodland and mires in Wiltshire and Berkshire.

POST-GRADUATE RESEARCH SEMINAR

The Post-Graduate Seminars started in 1971, and organized by Dr. Glover and Dr. Nandris, continue to be well supported. Several more papers were read this year than last. Their

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function was originally to constitute a link between post-graduate students and the other staff and students of the Institute. However, a number of outside lecturers have also continued to be represented, and the seminars have proved to have the additional merit of making contact between both internal and external individual workers and between related research topics. They are informal in nature, giving the possibility to present and to criticise work not necessarily in a final state for formal presentation. They sometimes prove, therefore, to be as informative for the lecturer as the audience, and the opportunity might be taken here to invite those interested either in a topic or in being put on the mailing list to contact Dr. Nandris or Dr. Glover.

The following papers were given during the session:

October 30th	Mr. B. Morris (L.S.E.)	The Malapantaram: a hunting and collecting people in S. India.
November 13th	Mr. S. Helms	Second Season at Jawa in Jordan.
November 27th	Mr. D. Pring	Ceramics of Northern Belize.
December 11th	Miss A. Claridge	Techniques of Roman Sculpture.
January 15th	Miss S. Walker	Nymphaea and Roman water installations in Greece.
January 29th	Mr. D. Price Williams	Environment and Settlement in the Negev.
February 12th	Angela Calder (Otago, N.Z.)	Cracked pots and rubbish tips: an ethnoarchaeological exercise in N.E. Thailand.
February 26th	Mr. J. Haslam	The Mediaeval Pottery of Surrey, 1300-1500.

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March 12th	Mr. M. Barbetti (Research Lab.)	Recent research on archaeomagnetism.
March 19th	Mr. R. Jones	Roman cemeteries of the Western Provinces.
April 30th	Miss May Ashmore	The Mesolithic of North Britain
May 28th	Dr. P.S. de Jesus	Investigations on prehistoric metallurgy in Turkey

Meetings are usually at 5 p.m. on a Wednesday at the Institute and take place roughly every fortnight.

RESEARCH SEMINAR IN ARCHAEOLOGY AND RELATED SUBJECTS

Three evening meetings were held at the Institute of Archaeology:

- I Dr. John Catt (Pedology Dept., Rothamstead Experimental Station) Loess Deposits in Southern England. 10 December 1974.
- II Dr. Peter D. Moore (Dept. of Plant Sciences, King's College) The influence of Prehistoric Land Use upon Peat Formation. 4 February 1975.
- III Dr. Barbara Pickersgill (University of Reading) Agricultural Origins in the Americas: independence or interdependence? 25 March 1975.

In addition, Professor J.V.S. Megaw and Dr. C.M.B. Greenhalgh organised a three-day residential conference at Leicester University, 3-5 January 1975. The theme of the meeting was Art, Artisans and Societies.

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SEMINAR FOR ARABIAN STUDIES

The ninth annual meeting of the Seminar was held at the School of Oriental & African Studies and the Institute of Archaeology, London, on 7th-9th July, 1975. It was again very well attended, and it was particularly pleasing to see so many colleagues from abroad, both as listeners and speakers.

The *Proceedings* of the previous Seminar, held at Oxford in 1974, were published this July. Again, the generosity of the Government of Abu Dhabi is gratefully acknowledged with regard to their contribution towards publication costs.

Dr. J.C. Wilkinson has resigned from the Committee, and we welcome in his place Professor T.M. Johnstone. The remainder of the Committee of Mr. P.J. Parr, Mr. J.E. Dayton (Hon. Secretary), Professor R.B. Serjeant, Professor A.F.L. Beeston, Professor E. Ullendorff, Dr. B. Doe, and Mr. T.C. Mitchell were confirmed in office for a further year.

Papers read at the 1975 Seminar were as follows:

Professor A. Ansara (Riyadh): Quryat Al-Faw.

Professor A.F.L. Beeston (Oxford): South Arabian warfare in the 2nd and 3rd centuries A.D.

Mr. N. Groom (London): The Northern passes of Qataban.

Professor G. Mendenhall (Michigan): Old North Arabic inscriptions of Umm Rujam: 7th c. B.C.

Professor G. Bowersock (Harvard): The limes in North Arabia.

Dr. E.C.L. Durrani (Leiden): Statuary in the round from Dilmun.

Mrs. L. Copeland & Mr. P. Bergne (London): Flint artifacts.

Dr. K. Frifeld (Aarhus): The Wadi Suq graves of Oman.

Dr. J. Pullar, Mr. J.H. Humphries & Dr. D. Whitcomb (Harvard):

- (a) Third Millennium Oman;
- (b) Islamic Oman.

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- Dr. A. Hamdani (Cairo): Evolution of the organisational structure of the Fatimid Da'wa.
- Dr. J. Grand'Henry (Louvain): The function of *ra'a* in spoken Arabic.
- Professor T. Johnstone (London): The reliability of M.S.A. texts of the Austrian S. Arabian Expeditions of the early 20th c.
- Miss B. De Cardi & Dr. B. Doe (London): Survey and excavation of late third millennium sites in Wadi al'Ayn, Oman.
- Professor W. Brice (Manchester): Climate and topographical changes in early Arabia.
- Mr. M. Roaf (Oxford): The work of the British Archaeological Expedition to Bahrain, 1975.
- Dr. B. Bibby (Aarhus): Bahrain and Omani connections.
- Mrs. D. Hawley (London): Omani silver.
- Professor R.B. Serjeant (Cambridge): The Islamic Trust.
- Professor I. Shahid (Washington): Abraha against Mecca: two Qur'anic Suras, CV-CVI.
- Professor S.A. Khulusi (Oxford): A 13th century poet from Bahrain.
- Professor W. Müller (Tübingen): Notes on the use of frankincense in South Arabia.
- Professor J. Ryckmans (Louvain): An ancient stone structure for the capture of ibex in 'Asir.

For the first time in the Seminar's history, the number of papers offered made it necessary to hold two parallel sessions of Epigraphy and Prehistoric Archaeology on one day of the meeting. It is hoped that most of the papers given will be published in the forthcoming volume 6 of the *Proceedings* of the Seminar.

The 1976 meeting will be held at the Middle East Centre, Sidgwick Avenue, Cambridge, from 12th to 14th July.

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ASSOCIATION FOR STUDIES IN THE CONSERVATION OF HISTORIC BUILDINGS

The most noteworthy event in the Association's year was perhaps the setting up of three architectural building conservation courses at the Leicester Polytechnic School of Architecture, the Liverpool Polytechnic Department of Architecture, and the Architectural Association School of Architecture. The Association has pressed for the establishment of such courses since its foundation and members were glad to learn that Mr. R.G. Wood, a member of their committee, had been appointed as Co-ordinator of the A.A. course.

The following meetings and visits took place during the year:

Anthony Dale: The Listing of Historic Buildings.

Ian Curry: Travelogue of the Study Tour of Paris.

ASCHB with Garden History Society: A Joint Symposium on the Treatment of the Surroundings of Historic Buildings.

ASCHB with Institute of Advanced Architectural Studies, York: Rome Study Tour.

Visit to Martock, Wells, Bradford-on-Avon, and Bath.

PUBLIC LECTURES AND EXHIBITIONS

Inaugural Lectures were given in March, by Professor J.D. Evans, who took as his subject "Archaeology as Education and Profession", and in May, by Professor F.R. Hodson on "Hallstatt".

The First Childe Memorial Lecture was given by Professor J.G.D. Clark in April on "Prehistory since Childe". The Special University Lectures were given during the Summer Term by Professor R. Hachmann, Universität der Saarländer, who lectured on "The Bronze Age Temples of Kamid el Loz" and "Belgae seen from the Continent".

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Lectures during the session included Professor A. Biran, Dr. A.M. Bryer (University of Birmingham), M.J. Cauvin (Centre de Recherche d'Ecologie Humaine et de Préhistoire), Dr. I.M. Crawford (West Australian Museum), Mr. P.L. Drewett, Miss Honor Frost, Dr. T. Marasović (Town Planning Institute of Dalmatia), Mr. I. Mirnik (Cultural Exchange Research Fellow), Mr. A. Moore (University of Oxford), Dr. E.J. Peltenburg (University of Glasgow), Professor M. Posnansky (University of Ghana), Bay Aytüg Tasyürek (Adana Museum), Lord William Taylour, Professor A.D. Trendall (La Trôbe University)

Several of the lectures were held in association with other bodies, such as the Institute of Classical Studies, the Palestine Exploration Fund, the Council for Nautical Archaeology, and the Anglo-Israel Society.

An exhibition illustrating the work of the Photographic Department was mounted in the Summer Term in connection with a Conference on Archaeological Photography held by the Royal Photographic Society at the Institute, and another was mounted on the work of the Sussex Field-Unit, in association with a lecture on the subject.

THE DEPARTMENTS

ADMINISTRATION

Director:	Professor J.D. Evans, M.A., Ph.D., F.B.A., (A.T.)*
Secretary and Registrar:	Dr. I.K. Orchardson, M.A., Ph.D. (from December, 1974)
Director's Assistant:	Mrs. M. Hunt
Executive Officer:	Miss E.A. Witchell, B.A., (from September, 1974)
Secretarial Assistant:	Miss E.M. Jeffery (from September 1974)

* A.T. Appointed Teacher, R.T. Recognised Teacher of the University of London throughout.

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The Director continued to serve as President of the Prehistoric Society and as Chairman of the Council of the Archaeology Abroad Service and the Area Archaeological Advisory Committee for South-East England. He was elected Director of the Society of Antiquaries of London, Chairman of the Council for British Archaeology's Education Board and a member of its Committee on University Education. He continued to serve on the Councils of the British Institute of Archaeology at Ankara, the Libya Society, the Executive Committee of the Council for British Archaeology, and the Management Committees of the Institute for Latin-American Studies, and the Percival David Foundation. He also continued to be a member of the Advisory Committee of the Horniman Museum, the British Museum Radiocarbon Dating Advisory Screening Committee and the Nautical Archaeology Trust. He was appointed a member of the Management Committee of the Courtauld Institute of Art and the Governing Council of the British Institute in Eastern Africa.

The Director visited Spain in October for three weeks under the Academic Interchange with Europe Scheme of the British Council. He gave a number of lectures at the Universities of Madrid and Granada, visited many sites and held discussions with colleagues.

In January and February the Director spent five weeks at the University of Legon in Ghana as Visiting Professor under the Inter-University Council's Short Term Visits Scheme. While there he gave a course of lectures on Mediterranean Prehistory and visited a number of sites including the Department Archaeology's Field Centre at Hani in the Brong/Ahafo region. He also gave a lecture at the National Museum in Accra.

He gave his inaugural lecture as Director in March (see p. 12) and in April attended the British Academy/Royal Society Meeting on the History of Agriculture, where he acted as a discussant.

PUBLICATIONS

By Professor Evans:

Archaeology, and Education and Profession, *Bulletin of the Institute of Archaeology*, 12, 1975. 1-12.

REPORT OF THE DIRECTOR FOR THE SESSION 1974/75

HUMAN ENVIRONMENT

Professor:	G.W. Dimbleby, B.Sc., M.A., D.Phil. (Oxon) (A.T.)
Senior Lecturer:	D.R. Brothwell, M.A., B.Sc. (R.T.)
Lecturers:	Miss J.M. Sheldon, B.Sc. (R.T.) K.D. Thomas, B.Sc., Ph.D. (R.T.)
Chief Technician:	P.I. Porter
Technician:	N.V.P. Syers
Secretarial Assistant:	Miss J. MacDougall Miss S.E. Seright (from November, 1974)

During September, Don Brothwell joined the staff of the Department, having been previously Head of Anthropology at the British Museum (Natural History). His teaching duties will be concerned with comparative vertebrate anatomy, human evolution in relation to the environment, and some aspects of geology in relation to archaeology. He came to take the place of Dr. Cornwall, who retired as Reader last year, and he has been appointed as Senior Lecturer.

Miss Seright has joined the Department as Secretarial Assistant, in place of Miss MacDougall.

The following students are working for Higher Degrees in the Department:

Ph.D.

P.J.P. McGeorge, Miss: Early population variability in relation to culture and the environment in the Mediterranean area.

R.N.L.B. Hubbard: Investigation of palaeobotanical evidence from deposits poor in organic remains; techniques and interpretation.

C.A. Schwartz: Initial domestication of animals in the Balkans and their effect on Neolithic cultures.

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M.Phil.

P.G. Dorrell: Geomorphology and settlement in S. Italy.

D. Williams: (Field of research) Recovery of environmental remains.

S.W. Hillson: To what extent can biological variation in ancient N.E. African populations be related to variation in their environment?

S.M. Harrison, Miss: Invertebrate zoology as applied to archaeological sites.

M.A. Robinson: Ecology of the First Gravel terrace of the Thames (Part time).

R.J. Watt: Variation and biological affinities of skeletal populations of the Romano-British people. Palaeopathology and Palaeodemography.

M.A.

Miss J. Siegal

At the beginning of the year the following candidates were notified that they had been successful in their Degree examinations the previous summer:

Miss M.A.T. Barnes (M.Sc.)

Miss E.C. King (M.A.)

Miss S.P. Robinson (M.A.)

In the B.Sc. examination of the two candidates one was awarded a First-Class, and one a Second-Class (II.1) Degree.

The growing importance of environmental archaeology has had its inevitable repercussion; Professor Dimbleby now serves on the following committees: Ancient Monuments Board Committee for Rescue Archaeology, South-East England Area Archaeology Advisory Board, York Archaeological Trust. In addition he is Chairman of the C.B.A. Scientific Research Committee. Mr. Brothwell is on the following committees: Chairman of the

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Library Committee, Member of Council and Standing Committee of the Royal Anthropological Institute, Executive Editor of the *Journal of Biosocial Science*, York Archaeological Trust.

In recent years Professor Dimbleby has been involved in the establishment of an A-level examination in Environmental Studies. The A-level is now in existence, and Professor Dimbleby is a member of the Environmental Studies Advisory Panel to the University Entrance and School Examinations Council. During the year he was invited to take the chair at one session of a teacher's conference sponsored by the University on this subject.

All members of the teaching staff have been very much involved with the investigation of material from sites from both Britain and overseas. As a result of the Department's work on the gardens of Pompeii, Professor Dimbleby gave a paper to a conference on "Historical Gardens and Landscapes" at Washington in April. He also presented a paper to the Discussion on the History of early Agriculture arranged jointly by the Royal Society and the British Academy. This will be published in due course, as will reports on the specialist investigations referred to above.

Both Professor Dimbleby and Mr. Brothwell have, as usual, given papers to various archaeological and scientific societies. They have also continued as two of the three executive editors of the *Journal of Archaeological Science*, now in its second volume.

Miss Sheldon was appointed Higher Degrees Admissions Tutor for the Institute and the administrative work in this connection proved very time-consuming in view of staff shortages in the Registry during this period.

PUBLICATIONS

By G.W. Dimbleby

The Legacy of Prehistoric Man. Chapter 18 in *Conservation in Practice* Eds. A. Warren and F.B. Goldsmith, 1974. pp. 179-209. J. Wiley & Sons Ltd., London.

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Archaeological Evidence of Environmental Change. *Nature* 256.
pp. 265-267, 1975.

The effect of man on the landscape: The Highland Zone. Summary
and conclusions. *C.B.A. Research Report* No. 11. pp. 127-
129, 1974.

(With I.G. Simmons), The possible role of ivy (*Hedera helix* L.)
in the Mesolithic economy of Western Europe. *Journal of*
Archaeological Science. 1 291-296

Analysis of Organic Remains. In: Excavations at the Custom
House site, City of London, 1973 by T. Tatton Brown.
Transactions of the London and Middlesex Archaeological
Society. 25 210-211.

By D.R. Brothwell

The Upper Pleistocene Singa Skull: A Problem in Palaeontological
Interpretation. In: W. Bernhard and A. Kandler (Eds.)
Biology of Human Populations. 534-545. Fischer, Stuttgart.

Evidence of population change and variability in the British
Isles. In: K. Saller and I. Schwidetzky (Eds.) 1974.
Rassengeschichte der Menschheit (2) 7-43. Oldenbourg, Munich.

Possible evidence of a cultural practice affecting head growth
in some late Pleistocene East Asian and Australasian
populations. *Journal of Archaeological Science*. 2 1975.
75-77.

(With Wojtec Krzanowski), Evidence of biological differences
between Early British populations from Neolithic to Medieval
times, as revealed by eleven commonly available cranial vault
measurements. *Journal of Archaeological Science*. 1 1974.
249-260.

By K.D. Thomas

Roman Oyster shells from buildings III and IV. In: H. Sheldon,
Excavations at Toppings and Sun Wharves, Southwark 1970-1972.
Trans. Lond. and Middlesex Arch. Soc. 25.

Report on Mollusca. In: G. Smith, Excavations of the
Stonehenge Avenue at West Amesbury, Wiltshire. *Wilts. Arch.*
and Nat. Hist. Mag. 68.

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PREHISTORIC ARCHAEOLOGY

Professor:	F.R. Hodson, M.A., Ph.D., F.S.A. (A.T.)
Senior Lecturer:	J. d'A. Waechter, Ph.D., F.S.A. (R.T.)
Lecturers:	J.G. Nandris, B.A., Ph.D. (R.T.) I.C. Glover, B.A., Ph.D. (R.T.) M.H. Newcomer, B.A., Ph.D. (R.T.)
Senior Lecturer in Latin American Archaeology:	W.M. Bray, B.A., Ph.D., F.S.A. (R.T.) (Joint post with the Institute of Latin American Studies)
Special Lecturer:	T. Sulimirski, Iur. D., Ph.D. (Lwow), Hon. F.S.A.
Secretarial Assistant:	Mrs. C.F. Page
Computing Assistant:	Mrs. R. Evnine

There were 43 students in the Department, 10 studying for the M.A., three jointly with the Department of Human Environment; one for the M.Sc., jointly with the Department of Human Environment, and four for the M.A. in Area Studies. There were 15 students studying for the M.Phil., two part-time, and 13 studying for the Ph.D., one part-time. Teaching was also provided for 20 intercollegiate students and two external students from Cambridge.

Hgher Degree students in residence are listed below:

Ph.D.

A.M. Ashmore, Miss: (Field of research) The Mesolithic of Scotland.

M. Suano, Miss: Aspects of the Iron Age in Abruzzo.

M.Phil.

S.D. Coulson, Miss: (Field of research) Lithic materials of Palaeolithic Culture and Study of Techniques as they apply to New World Archaeology.

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- G.T. Denford: (field of research) Comparison of Settlements on Dartmoor with those in other areas of Highland Britain.
- P.A. Greenwood, Miss: Aspects of the Settlement pattern and Economy of N.E. Italy from the Neolithic to the Iron Age.
- F. Hivernel, Miss: (field of research) Excavation and Study of Late Stone Age Sites in N. Kenya.
- A.G. Hooper: (field of research) Palaeolithic Cave Art.
- D.M. Jones: (field of research) Processes of acculturation between natives and Europeans in the Spanish-American Colonial Period.
- M. Salim: (field of research) The Study of Material from Sanghao Cave.
- I.S. Zeiler: (field of research) The Palaeolithic of Afghanistan.

M.Sc.

K. White, Miss (joint H/E).

M.A.

Miss A. Bunn, J.A. Clipson, Miss J. Goldman (joint H/E), J.K. Gollan, B.D. Nkemaka, Mrs. A.M. Kingsnorth, Mrs. C. Pestell (joint H/E), Miss A. Pateras, Miss S. Papadiamandopoulou, Miss C.D. Sloan (joint H/E)

During the session the Ph.D. Degree was awarded to the following students: G.P. Diamond and W.W. Phelps. M.A. Degrees were awarded to Miss Cartwright, Mrs. Langdon, Miss Hivernel and Miss King. Of the five students who successfully took the B.A. Hons. in June, four were placed in the Upper Second Class and one in the Lower Second Class.

Professor Hodson continued as a member of the Editorial Board of *World Archaeology*. He gave his Inaugural Lecture on the topic of the 19th century excavations at Hallstatt, and his current computer study of the finds.

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Dr. Waechter has been engaged in the preparation of a book about Man and his Culture.

Dr. Bray continued on the Council of the Royal Anthropological Institute and on the editorial boards of *Man* and *World Archaeology*. In the summer of 1974 (with Miss E. Carmichael of the Museum of Mankind as co-director) he carried out survey and excavation in the Jubones Valley of southern Ecuador, and lectured on preliminary results at the Easter conference of the Prehistoric Society. Dr. Bray chaired a session at Leicester University Seminar meeting on "Art, Artisans and Society" and organized and chaired a series of seminars on American archaeology for the Institute of Latin American Studies.

Dr. Nandris carried out fieldwork in southeast Europe from July to September, 1974, supported by the British Academy, Gordon Childe Fund, British Council and Central Research Fund. Obsidian sources were visited and flotation to recover plant remains was carried out. During May 1975 Dr. Nandris organized the visit of two archaeologists from Romania to this country, which was financed by the British Council. He attended the British Academy Anglo-Soviet Symposium in Cambridge in November 1974, and with Dr. Glover continued to run the Post-Graduate Research Seminars.

Dr. Glover continued on the editorial board of *World Archaeology* and, with Dr. Nandris, organized the Post-Graduate Research Seminars. He took six months leave of absence to continue his excavation of Ulu Leang cave in South Sulawesi, Indonesia, where he will stay to write up the site well into the next academic year.

Dr. Newcomer attended the international conference on flint in Maastricht in May, 1975, and again acted as External Examiner for the Extra-Mural Department of London University. He continued with the experimental archaeology programme at the British Museum's Grimes Graves excavations.

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PUBLICATIONS

By Professor Hodson

(with J.E. Doran) *Computers and Mathematics in Archaeology*.
Edinburgh University Press.

By Dr. Bray

"Mesoamerica" in Jacquetta Hawkes (ed.) *Atlas of Ancient Archaeology*. London, Heinemann.

By Dr. Newcomer

Study and replication of bone tools from Ksar Akil (Lebanon).
World Archaeology. 6. 138-153.

ARCHAEOLOGY OF THE ROMAN PROVINCES

Professor: J.J. Wilkes, B.A., Ph.D., F.S.A. (A.T.)

Lecturers: M.W.C. Hassall, M.A., F.S.A. (R.T.)
R.M. Reece, B.Sc., D.Phil., F.S.A.
(R.T.)

Secretarial Assistant: Miss J.C. Medrington, B.A.

At the beginning of the academic year the Department welcomed John Wilkes to the chair which had, for the previous year, been vacant following the premature death of Professor Donald Strong. Professor Wilkes came to the Institute from the University of Birmingham where he had held a senior lectureship in the Department of Hellenic and Roman Studies.

Teaching and supervision were provided for 48 internal students of whom 21 were taking B.A. courses, 4 were registered for the M.A. and 23 for other Higher Degrees. Fourteen students registered outside the Institute attended the inter-collegiate lectures on Roman Britain.

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Higher Degree students in residence are listed below:

Ph.D.

- D.D. Andrews: Medieval fortifications in Central Italy.
- G.N. Clarke: Late Roman burial custom with special reference to Lank Hills, Winchester.
- H. Cleere: The iron industry of Roman Britain.
- G.M. Davies, Miss: Roman funerary sculpture.
- R.F.J. Jones: Burial practice in the Western Provinces of the early empire.
- I. Mirnik: Coin hoards of the territory of modern Yugoslavia.
- C.J. Williams, Mrs.: Origins and development of colonnaded streets in the eastern Mediterranean.

M.Phil.

- S. Alban-Jones, Miss: Native rural settlement in the British Isles during Roman and early post-Roman periods.
- M.J. Hammerson: "Barbarous" coin issues of the later Constantine period.
- E.C. Hill: Cities of Roman Britain in the 5th and 6th centuries A.D.
- A.G. Rook: Aspects of the design and operation of Roman hypocausted baths in Roman Britain.
- I.M. Thompson, Miss: Economic growth in the Essex and Hertfordshire area from 54 B.C. to A.D. 69.
- S. Walker, Mrs.: Influence from Italy and the Eastern Empire on Roman architecture in Greece.

M.A.

- Mrs. H.A. Baron , R. Burn-Murdoch, Miss S.H. Farrand, M.G. O'Connell.

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The degree of M.A. was awarded to R.S. Kelly, Miss M. Robb and Miss I.R. Schwab. Of the seven third-year students specializing in Roman courses who took their B.A. Hons. examination in June, five were placed in the upper second and two in the lower second class.

Departmental seminars were held on a variety of topics and 16 of these were conducted by guest speakers. In addition Dr. M.A.R. Colledge and Dr. M. Fulford assisted with teaching in the Department.

Professor Wilkes served on the Faculty of Ancient History and Archaeology of the British School at Rome, the Council of the Society for the Promotion of Roman Studies and its Editorial Committee as Review Editor of *Britannia*. He also served as a trustee of the Vindolanda Trust, represented the Society of Antiquaries of London on the committee for the Haverfield Bequest and is a member of the British committee under the auspices of the British Academy of the Comité International pour l'étude des cités antiques. He served on the Archaeology Panel of the London School Examinations Council, the Department of the Environment Area Archaeological Advisory Committee for Greater London and the Urban Research Committee of the Council for British Archaeology.

During the year he also attended symposia on the *Notitia Dignitatum* at Oxford and on the Saxon Shore at Chichester, and he delivered lectures to archaeological societies in Birmingham, Coventry, Tamworth and Lampeter. In August he conducted excavations in the Roman military station at Carpow, Perthshire.

Dr. Reece continued to serve on the Councils of the Bristol and Gloucestershire Archaeological Society, the Cirencester Excavation Committee and, as the Institute's representative, on the Colchester Excavation Committee. He also served on the Nene Valley Research Committee, the Council for British Archaeology and the Council of the Society for the Promotion of Roman Studies. He continued to serve as Tutor for Undergraduate Admissions to the Institute and on the Advisory Panel of the London 'O' level Archaeology Board, for which he helped produce a syllabus and specimen paper for the first

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examination to be set in 1977. He sat on the steering committee of a new volume on Coin hoards and edited the section of Roman coin hoards in the first volume published by the Royal Numismatic Society; he also continued work on the coins from excavations in Carthage and Benghazi, the latter being finished on the spot in Libya. In July he started on the excavation of an Early Iron Age enclosure near Cirencester and in August he started work on the Cirencester census of 1871 in conjunction with the birth, marriage and death registers of the parish to obtain a full picture of the population of the town in the late nineteenth century. During the summer he also finished the preparation of ten years' excavations on Iona for publication.

Mr. Hassall continued work on the Roman Inscriptions of Britain and was co-opted to assist in the preparation of a new bibliography to be produced annually by the Royal Historical Society. He served on the examination boards for Classics, History and Education, on the Board of Studies in Classics, the Management Committee of the Institute of Classical Studies, and the Arts Advisory Committee of the Regional Advisory Council for Technological Education. Outside the University he served on the Councils of the Society for the Promotion of Roman Studies and the Royal Archaeological Institute, the Chelmsford Excavation Committee and the Management Committee of the City of London Archaeological Trust. He gave a number of outside lectures and spoke at Conferences organized by the Extra-Mural Department of Oxford University on the *Notitia Dignitatum* in December, and by the Council for British Archaeology on the Saxon Shore in May.

PUBLICATIONS

By Professor Wilkes

The Antonine Wall Fortlet at Wilderness Plantation, Lanarkshire,
Glasgow Archaeological Journal. 3, 1974. 51-65.

Various reviews.

By Dr. Reece

Iona; its History and Archaeology. 2nd ed., Glasgow 1975.
16 pp., 5 plates.

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Roman currency: new thoughts and problems, *World Archaeology*, Vol. 6, n. 3, February 1975. 299-306.

Early medieval quarries at Ewen 1971-2, *Transactions of the Bristol and Gloucestershire Archaeological Society* XCIII, 1975. 131-5.

The Knights Hospitaller at Quenington, *ibid*, 136-4.

The Roman coins in Frere and St. Joseph, The Roman fortress at Longthorpe, *Britannia* V, 42.

Cirencester, the development and buildings of a Cotswold town (with C. Catling). *B.A.R.* 12, Oxford 1975. 78pp., 9 plates.

Edited Roman coin hoards in "Coin Hoards I", *Royal Numismatic Society*, 1975, 47-57.

Various reviews.

By Mr. Hassall

Excavations at the New Market Hall, Gloucester, 1966-7 (with J. Rhodes). *Transactions of the Bristol and Gloucestershire Archaeological Society* XCIII, 1975. 15-100.

Roman Britain in 1973: Part II Inscriptions (with R.P. Wright) *Britannia* V, 1974. 461-70.

Rome and the Eastern Provinces at the end of the second century B.C., (with M. Crawford and J. Reynolds). *Journal of Roman Studies* LXIV, 1974. 195-220.

Various reviews.

WESTERN ASIATIC DEPARTMENT

Professor: E.E.D.M. Oates, M.A., F.B.A., F.S.A.
(A.T.)

Lecturer in Mesopotamian
Archaeology: Miss B. Parker, O.B.E., F.S.A. (R.T.)

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Senior Lecturer in the
Archaeology of the Levant: P.J. Parr, M.A., F.S.A. (R.T.)
Lecturer in the Archaeology
of Anatolia J. Mellaart, B.A., F.S.A. (R.T.)
Seminar in Metallurgy and
Metal Typology: Mrs. K.R. Maxwell-Hyslop, F.S.A.
(R.T. Rtd.)
Secretarial Assistant: Mrs. M.P. Wyatt.

There were 45 students in the Department, of whom 8 were reading for B.A. degrees (4 specialising in Mesopotamian archaeology, 1 in Anatolian and 3 in the archaeology of the Levant), 5 for the Diploma 3 in Mesopotamia, 1 in Anatolia and 1 in the Levant) and 6 for the M.A. The remaining 26 were registered for other Higher Degrees.

Higher Degree students are listed below:

MESOPOTAMIA

Ph.D.

L. Al-Gailani, Mrs.: Old Babylonian seal impressions in the Iraq Museum.

J.E. Curtis (part time): Late Assyrian metalwork.

E.R. Ellison, Mrs.: Diet in ancient Mesopotamia.

M.E. Stout, Miss: Warfare in ancient Mesopotamia.

M.Phil.

S. Shahin, Miss: Cylinder seal impressions in Persia.

LEVANT

Ph.D.

N.I. Khairy: A typological study of the unpainted pottery from the Petra excavations (1974).

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M.A.

Mrs. L. Geffon, R. Schiemann, Miss D. Weinstein.

ANATOLIA

M.A.

Miss G. Mueller, Miss J. Leatherby, Miss M. Trentin.

D. Noble and Miss Elliott obtained their doctorates. R.L. Chapman, Miss M.A. Leveque, Rev. J.M. Matthers and Miss E. Saltzman were successful in the final examination for the B.A. degree in the archaeology of the Levant, and one student obtained the Diploma in the archaeology of Mesopotamia:

Professor Oates was given leave of absence for the month of February to make a survey of sites in the Khabur region of eastern Syria with a view to future excavation. He also visited sites on the Middle Euphrates that are to be flooded following the construction of a new dam, and studied material in the museums of Damascus, Aleppo and Der ez Zor. His work was financed by a grant from the British School of Archaeology in Iraq and generously aided by the Directorate General of Antiquities of the Syrian Arab Republic.

Mr. Parr received a Hayter Travel Award and spent five weeks of the summer vacation in the Middle East where he completed an architectural study of the Baths at Petra and visited Syria in connection with his proposed excavations there. He was invited to join the Saudi Arabian Archaeological Survey Advisory Committee, and he attended its first meeting in Riyadh in November.

Miss Parker attended the meeting of the Rencontre Assyriologique in Gottingen in June.

We regret her retirement from the post of part time Lecturer in the Department, in which she has given full time and unstinted service for the last fourteen years.

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PUBLICATIONS

By Miss Parker

Cylinder seals in Tell Rimah, *Iraq* XXXVII, 1975

By Mr. Mellaart

A note on Cypriot Early Bronze Age chronology in *Report of Department of Antiquities, Cyprus* 1974. p. 38.

By Mrs. K.R. Maxwell Hyslop:

Assyrian sources of iron - a preliminary survey of the historical and geographical evidence in *Iraq* XXXVI.

CONSERVATION

Senior Lecturer-in-Charge: Miss I. Gedye, B.A., F.I.I.C.
(R.T.)

Lecturers: N.J. Seeley, B.Sc., Ph.D.,
M.R.I.C., M.Inst.P. (R.T.)
Miss P. Pratt (R.T.)
Miss E. Pye, M.A. (Liason Officer
for the International Centre
for Conservation, Rome)

Secretarial Assistant: Miss V.E. Pulfer.

There were 37 students in the Department, of whom 6 formed the first year's intake of the new degree in Archaeology specialising in Conservation. 19 students were studying for the second and third years courses of the Diploma in Conservation, and four for the Museums Association Certificate. In addition, seven students were registered for the degree of M.Phil., and one for the Ph.D. These are listed below, together with their field of study.

Ph.D.

E.N. Caner, Miss: The mechanism of the deterioration of certain Anatolian building limestones.

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M. Phil.

- D. Charalambous: The corrosion of ancient copper alloys.
- A. Erlij, Miss: Metal coating techniques on Pre-Columbian artifacts.
- R. Haber (joint Levant): Ceramic fabrication techniques.
- R.H. Keeley: Applications of electron probe microanalysis in the examination of antiquities.
- P.M. Pratt, Miss: Conservation of painting on mud plaster.
- R. Vatandoost: The composition and technology of early Iranian bronzes.
- T.S. Weisser, Miss: The corrosion of simulated ancient copper alloys.

No new students are being accepted for the Certificate in Conservation, and the teaching of this course is being phased out over a period of three years. In its place, students will be registered for the degree of B.A. or B.Sc. in Archaeology, specialising in Conservation. The degree is taught on the Course Unit system, and the conservation content is constructed on the basis of the Diploma, but students take in addition several other courses of study within the Institute with the option of including additional course unit courses from those offered if they so wish.

The Diploma in Conservation was awarded to 9 students, two of them with a distinction. The Museums Association Certificate was awarded to 3 students, one with a distinction.

Miss Ione Gedye retired at the end of the year after 30 years on the staff of the Institute. At her particular request, the money subscribed to mark her retirement will be used to found an annual prize for conservation in the Institute.

After many valuable years service to the Department as external examiner, Dr. Werner left the British Museum Research Laboratory to take up an appointment in Honolulu.

The post of Liaison Officer for the International Conservation Centre, Rome, held in the Institute by Miss Pye,

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is no longer being supported by the Centre. Miss Pye has agreed to remain as their Honorary Liaison Officer in London.

Dr. Seeley, Miss Pratt, and Miss Pye attended the conference "Conservation in Archaeology and the Applied Arts" in Stockholm from 2 - 6 June, 1975.

The annual Seminar in Conservation arranged jointly by the Institute and the British Museum was held from 21 April to 31 May, 1975. 22 students from 15 countries attended, of whom 10 registered for the lectures only and the remainder also received practical training at the British Museum, the Horniman Museum, the India Office Library, or the Museum of Mankind.

Dr. Seeley has accepted honorary editorship of *Studies in Conservation*, the journal of the International Institute for Conservation.

Dr. Seeley was invited to become consultant to the British Library Board on matters relating to conservation; and during the Summer vacation carried out a survey of conservation requirements for the British Library Reference Division.

During July and August 1975, Miss Pratt, together with a team of conservators from the Department, continued with the conservation of Roman wall paintings in the tombs of the Roman site of Anemurium, Turkey, for Professor J. Russell, University of British Columbia and Professor E. Alföldi-Rosenbaum, University of Toronto.

Miss Pratt continued to serve on the Advisory Committee of the Horniman Museum, and was elected to serve on the Council of the British Institute of Archaeology in Ankara.

Miss Pye worked in Libya for two months during the Summer Vacation supported by funds from the Hayter Travel Fund and the Gordon Childe Fund, as Assistant Director at the site of Sidi Khrebish, Benghazi, under the auspices of the Libyan Department of Antiquities and the Society for Libyan Studies, on the reconstruction and conservation of Roman wall paintings from the site. Miss Pye was also invited by the Libyan Department of Antiquities to advise them on the setting up of a

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conservation laboratory in Tripoli, and spent a preliminary week there investigating the facilities and requirements before submitting a report and recommendations to the Department.

During the year, students from the Department completed the conservation of five stone effigies in the Temple Church, London, for the authorities of the Inner and Middle Temple, and carried out a detailed examination of three painted wooden angels from the roof of Holy Trinity Church, Blythburgh, Suffolk.

PUBLICATIONS

By Dr. Seeley:

Mössbauer spectroscopy in archaeology, *Nature*, 1975, 254, 479.

Various reviews.

SUSSEX ARCHAEOLOGICAL FIELD UNIT

Field Director:	P.L. Drewett, B.Sc.
Senior Field Officer:	O. Bedwin, M.A., Ph.D.
Urban Officer:	D.J. Freke, M.A.
Research Assistant:	Miss C. Cartwright, M.A.
Director, Crawley Project:	
Project:	J. Gibson-Hill, B.Sc.
Director, Bishopstone	
Project:	M.G. Bell, B.Sc.
Illustrator:	Mrs. L. Drewett, Dip. A.D., A.T.D.
Secretary	Mrs. C.F. Page (joint with Prehistoric Department)

The activities of the Unit are now supervised by a Management Committee consisting of Mr. F. Aldsworth, Mr. A. Down, Mr. E. Holden, Dr. G.J. Wainwright, and the Field Director under the Chairmanship of Professor J.D. Evans.

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Mr. Drewett continued the total excavation of a Bronze Age Round Barrow Cemetery on West Heath which again acted as the centre for the Institute's Easter Field Course. He also undertook a survey of plough damage to known archaeological sites in Sussex and an intensive pilot survey of Bullock Down. Dr. O. Bedwin totally excavated a late Mediaeval Forge and Post Mediaeval Fulling Mill at Ardingly and excavated a large area adjacent to the Anglo-Saxon cemetery at Saxonbury.

Mr. D.J. Freke continued a programme of excavations in the Late Saxon town of Lewes and prepared a policy document on the destruction of archaeological areas in historic towns in Sussex.

Mr. J. Gibson-Hill completed a long-term project involving the total excavation of an extensive Romano-British Iron Working site at Broadfields, Crawley.

Mr. M. Bell completed his excavations at Bishopstone where an attempt is being made to establish the relationship between settlement, economy and environment from the Bronze Age to the present day.

Four small excavations were undertaken by undergraduates on behalf of the Unit at Alfriston (T.P. O'Connor), Bognor (M. Pitts), Elsted (M. Redknapp and M. Millett) and Hastings (D. Rudling).

The unit prepared an annual report containing thirteen interim reports for publication in the *Bulletin*. Six final excavation reports were also prepared for publication in national and local journals.

Close co-operation was maintained with other Departments in the Institute. Mrs. S. Thomas of the Conservation Department established a temporary laboratory in Lewes Museum to undertake immediate conservation during the summer. Professor Dumbleby undertook pollen analysis for the barrows at West Heath. Mr. Stewart completed a survey of West Heath and provided equipment for the excavations from the Department of Drawing and Surveying. Once again facilities were provided by the Photographic Department with the co-operation of Mr. Dorrell.

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PUBLICATIONS

By Mr. Drewett

Excavations at the Bishop's Palace, Lincoln 1968-72 (with H. Chapman and G. Coppack). *Occasional Papers in Lincolnshire History and Archaeology*, No. 1, 1975, 1-62.

Rescue Archaeology. *Sussex Life*, 11(8), 1975, 26-29.

By Mr. Gibson-Hill

Broadfields, Crawley. *Bulletin of the Wealden Iron Research Group* 8, 1975, 47-50.

SURVEYING AND DRAUGHTSMANSHIP

Lecturer: H.M. Stewart, B.A. (R.T.)

Assistant: Miss M. Mackenzie, Dip. A.D.

The first year course was attended by 56 students, of whom 20 were from other Colleges of the University. A newly created advanced course with a course-unit value was attended by 11 internal students in their second year. In addition an intensive course in Draughtsmanship was given to a member of the Department of Antiquities, Cyprus. The teaching of Surveying continued in the Field Course held in Sussex during the Easter vacation.

Miss Mackenzie spent a month in Denmark drawing finds from an excavation by the Ribe Museum.

PHOTOGRAPHY

Lecturer: P.G. Dorrell, B.Sc. (R.T.)

Assistant: G.T. Denford, B.A.

REPORT OF THE DIRECTOR FOR THE SESSION 1974/75

A total of 79 students attended courses; of these 34 Institute students and 21 inter-collegiate students were given short introductory courses, 10 archaeology and 6 first-year conservation students followed longer courses leading to a course-unit examination, and 8 second-year conservation students attended longer practical courses. A more specialized course for second-year conservation students, leading to a further 1/2 course unit, will be available in the coming year. The Department carried out a considerable amount of photographic work for Institute staff, and help was given with the illustration of theses and dissertations. The introduction of undergraduate dissertations has meant an increase in this type of work.

During the Easter vacation Mr. Denford acted as photographer for the Institute's Sussex excavations, and during the Summer vacation Mr. Dorrell took part in excavations in Syria.

Mr. Martinez resigned at the beginning of the year to take up an appointment with an international organization.

LIBRARY

Librarian:	Miss G.C. Talbot, M.A., A.L.A.
Assistant Librarians:	Miss H.M. Bell, B.A. Miss B. Barratt, B.A., A.L.A.
Library Assistant:	Mrs. F. McDonald, A.T.C.L.
Collections Clerk:	Miss J. Philips, B.A.

For the first time for several years we had no staff changes during the year, but Miss Talbot retired as Librarian at the end of the year. Unfortunately, however, we also had no regular secretarial help and, as Birkbeck College was no longer able to type our catalogue cards, our author and subject index entries fell into arrears.

The experiment of having a member of staff permanently on duty at the door proved useful on balance. Although the

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operation is time-consuming for the librarians it is good to have a check on those coming into the library, and on the books which are removed for photocopying. Fewer books, although more pamphlets, were lost during the year, but losses remain serious, particularly in some fields such as Middle Eastern archaeology and Domestication. The introduction of day tickets and a subscription membership for recommended readers was apparently successful, the latter providing a small but welcome contribution to library funds.

As soon as the mobile stacking was installed in our new store a major work of selection of books for store was undertaken. Periodicals chosen were mainly completed or discontinued runs; older books, duplicate copies and some of our more valuable books were sorted out. All were re-labelled and placed, together with those already in store, in the same classification order as that of the working library, so that anyone wishing to see all books in a section can do so. A certain number of obsolescent and duplicate works were abstracted for sale, and will be disposed of during the next year.

It was found that the Conservation Department had been presented with a number of books which had never been accessed and these were added to the library catalogue during the summer. The availability of books held by departments was reviewed and it was agreed that these may be borrowed for short periods, or read in the library.

It was felt that readers were being seriously inconvenienced by the lengthy absence of books and periodicals sent for binding. A new system, whereby smaller batches of volumes are sent to the binders for much shorter periods, regularly throughout the year, is now being tried. The decrease in the number of volumes bound during this year is partly due to this change, and partly to the increased cost of binding.

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<u>Books</u>		<u>Pamphlets</u>	
Purchased	579	Purchased	190
Presented	185	Presented	365
Exchanged	<u>62</u>	Exchanged	<u>99</u>
Total:	<u>826</u>	Total	<u>654</u>
<u>Periodicals</u>		<u>Volumes bound</u>	
Total:	706	Total:	241

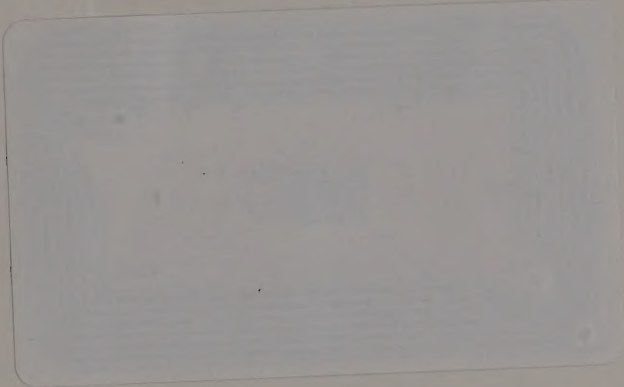
The above is a summary of the additions made during the year.

Volumes lent totalled 5,897, the highest month being November (787) and the lowest August (162). 113 volumes were borrowed, or photostats obtained from outside libraries, and 73 were lent by us. Photostats were also supplied at 4p a page.

The following have presented books, periodicals and pamphlets: Ashmolean Museum, Oxford; Australian Institute of Aboriginal Studies; British Archaeological Association; British School of Archaeology in Iraq; Bureau of Historic Sites and Properties, Florida; Council for British Archaeology; Council for British Archaeology, Group 5; Council for Nautical Archaeology; Danish Cultural Attaché; Department of the Environment; Editor of Endeavour; Field Museum of Natural History, Chicago; Guildhall Museum, London; Institute of Archaeology, Students' Union; Institute for Balkan Studies; Institute of Classical Studies; Institute of Latin American Studies; Israel Embassy, Press Office; Meiji University, Tokyo; Museo di Bavanello, Campobasso; Museum of Art and Archaeology, University of Missouri; National Maritime Museum, Greenwich; School of Oriental and African Studies; University of Birmingham, Computer Centre; University of California, Archaeological Research Facility; University of California,

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Department of Anthropology; University of London, Senate House Library; University of Tokyo. D.P. Agrawal; D. Andrews; V.S. Atasoy; I. Azoury; F. Bagherzadeh; L. Barral; B.M. Barratt; S.M. Bibikov; P. Bosch-Gimpera; S. Bottema; J. Bracker; W.M. Bray; D.R. Brothwell; A. Bull; J.M. Bull; G. Carter; J. Cauvin; M-C. Cauvin; F. Celoria; J. Chavailler; D. Chipperfield; A. Christopolou; Lady Clauson; J. Clutton-Brock; I.W. Cornwall; S.B. Deo; G.W. Dimbleby; M.S. Drower; E. During-Caspers; E. Evans; J.D. Evans; H. Field; A. Frankfort; D. French; M.C. Genito Gualandi; A.E. Glock; I. Glodariu; I.C. Glover; M. Golding; P.-L. Gouletquer; M.J. Green; R. de la Guadia; V. Hankey; J.D. Hawkins; S.W. Helms; F. Hivernel de Guerre; R.F. Hoddinott; H.W.M. Hodges; F.R. Hodson; F. Hours; R.N.L.B. Hubbard; A. von Humboldt-Stiftung; B.S.J. Isserlin; P.S. de Jesus; C.E. Joel; P. Johnstone; T.S. Kawami; R.S. Kelly; W.B. Kennedy Shaw; A. Kosse; H.C. Lane; D.M. Lang; A. Lathom; I.D. Margary; R.J. Mason; S. McGrail; J. Mellaart; A.M.K.H. Mian; M. Millburn; J.H. Money; J. Munby; M.L.K. Murty; R.R. Newall; M.H. Newcomer; D. Noble; P.J. Parr; V.M. Patino; D. Philips; L. Pomerance; L. Press; D.C. Pring; S. Ratnagar; D. Ridley; J. Rosen-Przeworska; M.W. Saunders; E. Schiemann; H. Sheldon; C.D. Stephens; T. Sulimerski; G.C. Talbot; S.A.S. al-Tamini; T. Tatton-Brown; J. du Plat Taylor; A. Thom; I. Thompson; G. Turner; J. d'A. Waechter; B.B. Watt; H.R. Wilkinson; J.J. Wymer.



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